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A THESIS

PRESENTED TO THE FACULTY OF THE GRADUATE SCHOOL OF
CORNELL UNIVERSITY FOR THE DEGREE OF

DOCTOR OF PHILOSOPHY

BY

FRANK APP

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Reprinted from
New Jersey Agricultural Experiment Station Bulletin 294
New Brunswick, N. J., September 20, 1916

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# Farm Profits and Factors Influencing Profits on 370 Potato Farms in Monmouth County, New Jersey.

BY

FRANK APP, AGRONOMIST.

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## INTRODUCTION

The problem of measuring farm efficiency is commanding increased attention as the value of land increases. It is essential that some method be found to modify farming operations in order that they may be adapted to our modern conditions. The increased value of farm lands and other equipment requires a much greater amount of capital, which, too, is an important factor in demanding more efficient use of land and equipment. A generation ago, when land was cheap and could be obtained by settling upon a tract and improving it for farming purposes, there was no incentive to economize in the use of land. Today land values have increased to such an extent that in restricted areas some types of farming are prohibited because of the heavy land rental. In short, nothing but intensive cropping is profitable, because large receipts per acre are necessary to return a profit for the cost of labor, fertilzer and rental. To a large extent this change of conditions is followed by a corresponding change of crops, but the proper adjustment, to be obtained accurately, must be found by careful and painstaking investiga-

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Prepared April 20, 1916.

tion. This is a repetition of history in old civilized countries. As population increases, greater production is needed, and land values rise with the increased value of products obtained from the land. A continuous change of land values always affects the adjustment and proper organization of the farm.

Still another factor, labor, has influenced farm operations. Throughout most farming regions the supply of labor is an important factor. That it is becoming more so each year is evidenced by the increased investment in labor-saving machinery.

With these two factors changing, namely, land values and labor, both of which influence the profits of the farm to a great degree, the problems of farm organization, farm efficiency, the proper type of farming, the proper relation of live stock to the farm, and the proper relation of land, labor and capital, entail many difficulties in clearly isolating measurable factors which bear directly on farm profits. Through this great lack of so-called efficiency on farms, and through lack of means of measuring efficiency factors by agricultural educators, the business of farming and the people interested in farming have been severely criticised by men in other professions. However, conditions are not as bad as would appear to the man in another profession. His business is largely controlled through his own initiative, while the farmer is to a large extent dependent upon nature. Losses may result through causes wholly beyond the control of the farmer. In short, there are many more factors entering into the proper manipulation of the agricultural industry than in manufacturing enterprises. Until recently we have not appreciated the need of methods by which to measure farm efficiency or to ascertain carefully what these factors are. However, with the readjustment of farming conditions, and the increased attention attracted by farming, this need is severely felt.

Efficiency engineers have reorganized many manufacturing establishments with very productive results. So, too, has the farmer reorganized his farm business by introducing new machinery and other labor-saving devices, and in some instances by increasing or decreasing the farm area or changing the type of farming to meet the current conditions. Moreover, many of these changes have come about by force of circumstances rather than through measurement of results to be obtained from such changes, or through the careful estimation of the need of them. This may have been no fault of the farm operator, for there was no definite information to guide him in making changes in his farming operations.

The object of this bulletin is not to present a general treatise on farm management or farming conditions, but it is to determine important factors which affect success and failure in potato farming of Monmouth County, New Jersey. To a certain degree, the writer has attempted to determine the efficiency and measures of efficiency of a specialized type of farming, where potatoes are the principal crop. The conclusions reached should to a large extent be applicable to similar regions where potatoes are a specialized staple crop.

## METHOD OF OBTAINING DATA AND INFORMATION

In gathering the data for this survey, each farmer was visited by a man who obtained the necessary information from him directly by personal interview. For a type of farming consisting largely of potato growing, this is not as difficult as for a more diversified type. The major portion of receipts and expenses is in lump sums, a condition which simplifies to a large degree the work of taking the record. Each man was detailed to a definite territory, and required to visit every farm, whether good or bad, prosperous or otherwise. The traveling was done by bicycles, which appear to furnish the most efficient means where good roads prevail. While a horse and buggy is commonly used in this work, it is not as efficient in covering distance and saving time as the bicycle.

All records were recopied on an office blank and checked several times to discover any possible errors and make the proper corrections.

It is essential that men who take records be quick to think, know how to approach a farmer, and be familiar with farming conditions in the neighborhood. Occasionally it is necessary for a man to go back to a farm and check over his record or correct some oversight. Thus the accuracy of survey work and survey records depends in no small degree on the men who do the work.

## DEVELOPMENT OF THE POTATO INDUSTRY IN MONMOUTH COUNTY AND ITS RELATION TO THE DEVELOPMENT OF OTHER AGRICULTURAL PRODUCTIONS

Monmouth County is considered among the most prosperous counties in the United States. Since the early history of its agriculture it was always regarded as a prosperous and flourishing farming region. According to the United State Census Reports, we find the development of the potato industry from 1840 up to the present time as given in Table I.

**Table I.—Production of Potatoes, Rye and Corn in Monmouth County, New Jersey, 1840–1910.**

| Year. | Potatoes. bu. | Rye. bu. | Corn. bu. |
|---|---|---|---|
| 1840, | 273,280 | 39,368 | 493,554 |
| 1850, | 773,272 | 82,833 | 841,072 |
| 1860, | 1,051,525 | 97,224 | 859,877 |
| 1870, | 1,263,403 | 46.567 | 760,479 |
| 1880, | 796,388 | 133,560 | 1,048,940 |
| 1890, | 914,286 | 158,443 | 875,847 |
| 1900, | 926,035 | 126,700 | 1,029,560 |
| 1910, | 1,893,523 | 162,323 | 1,099,656 |

For the entire period potatoes have been crowding the other crops. Hence the only two staple cash crops that have increased in quantity to any appreciable extent through this whole period are rye and corn. The production of wheat has increased from the 1840 period, but appreciably decreased from the 1850 period. Between 1840 and 1850 potatoes made a remarkable increase. The same is again shown between 1900 and 1910. The yield for 1910, as given by the census, is 128 bushels per acre, which, if compared to our survey results, is quite low. The average yield by the survey was 83 barrels, or 228 bushels, per acre, almost double that shown by the 1910 census report. This is in all probability due to the climatic conditions of the year of 1909 for potato production. The season was hot and dry, circumstances which depressed the potato yield for the State very markedly. Therefore, the census does not show the representative potato production for the county, since the year 1909 furnished abnormal climatic conditions with respect to potato growing.

The total production of potatoes from these 370 potato farms alone, in 1914, was 2,207,375 bushels, or 802,682 barrels. Therefore, it would be a conservative estimate to place the present production of the county at 4,000,000 bushels. Around the Freehold district, potatoes are by far the dominating crop for most of the farmers, and other crops and stock are sacrificed to devote most of the energies and time to potatoes. In the eastern part of the county trucking and dairying are quite prominent, but the potato still remains important as a cash crop, though no longer the major source of income. In the western part of the county potatoes are combined with more farm stock, including hogs and dairy cows. This necessitates larger areas of corn, rye and hay. Here the soils become too heavy for the most profitable production. The heavy soil conditions increase the cost of tillage, as well as decrease the acre yields. In the early history of the county cows, hogs and sheep were prominent in the farmers' business, but now this live stock has been sacrificed in many cases for the potato. The census of 1840 reports 19,592 head of cattle and 23,241 hogs. In 1910, 9,256 dairy cows and 14,132 hogs are reported; sheep have decreased in number from 13,696 in 1850 to 1,333 in 1910, while during the survey of 1914 less than 100 sheep were found. In short, we find that in this county's earlier history potatoes were grown rather freely, but the greatest and most rapid development has come about within the last fifteen years. From 1900 to 1910 we find an increase from 926,035 bushels to 1,893,523 bushels, and 1914 and 1915 to approximately 4,000,000 bushels. The area devoted to potato growing increased in 1900 to 1910 from 8,910 to 14,784 acres, while in 1914 there were 9,671 acres of potatoes on 370 potato farms alone. Evidently, the industry has not yet reached its highest limit, for this is approximately one-third of the total crop acres on the farms, and later data will throw further light on the effect of increasing this acreage to 50 or 75 per cent. of the farm crop area. Whether potatoes will in the near future give way to another crop is doubtful, since when raised on the intensive scale, they can successfully compete with other staple truck crops. If land is selected which is best adapted to potato culture, nothing short of disease or extreme market fluctuation is likely to decrease the importance of this crop in the county.

## LOCATION AND DESCRIPTION OF MONMOUTH COUNTY POTATO AREA

The Freehold area, which is the center of the potato region in the county, is 42 miles from New York City, 30 miles from Trenton and 70 miles from Philadelphia. From Freehold as a center, the area in which potatoes predominate reaches north about six miles to Robertsville, thence the boundary extends northeast, passing within one mile south of Morganville, and continuing northeast to about one mile north of Crawford's

Corners. The eastern boundary extends east almost to Lincroft, Tinton Falls, Scobeyville and Colts Neck. The southern boundary lies about three miles south of Freehold and extends from the headwaters of the Manasquan River, west through Smithburg, and thence northwest to Bergen's Mills. The line from this point runs approximately northeast to Robertsville, including Englishtown and Tennent in the area.

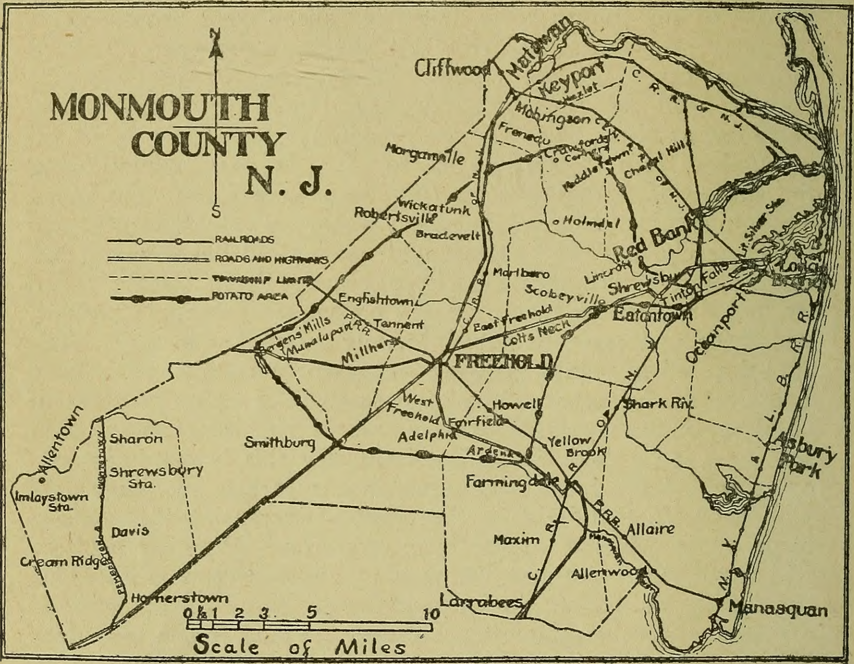

Fig. 1.—Map of Monmouth County, New Jersey, Showing Potato Area Included by this Survey.

This whole area is largely overlaid with Collington, Sassafras and Colts Neck soils. The topography is level to gently rolling, with good drainage. The section is well equipped with railroad shipping stations, facilities which help to make this industry possible. The Freehold branch of the Central Railroad of New Jersey leads from Freehold north through Morganville. Farmers in the eastern section of this area can reach the Red Bank branch of the New Jersey Central, while the northeastern portion is within reach of the New York and Long Branch Railroad. The Pennsylvania Railroad enters Freehold from the southeast and continues in a northwesterly direction through Tennent. With the exception of a small section around Colts Neck, most of this area is within four miles or less of a railroad. This is important for an industry requiring such a large amount of hauling in a comparatively short time. The roads of this area, some of which are macadam, are usually good. This enables the potato growers to haul heavy loads, and thus economize in marketing their product. The area is thus with a combination of soils, railroad facilities, and improved dirt and macadam roads, which fits it admirably to intensive and extensive potato culture. Other parts of the county have one or two of these requirements, such as railroads and dirt roads, or soils and good dirt roads, but the third factor is missing. The other types of soil are not so well adapted to the production of the crop, and where they prevail, either trucking, dairying or more general farming is substituted for this industry.

## SOILS

The soils of this potato area, as mapped by the Geological Survey of New Jersey and the U. S. Department of Agriculture,[1] consist of unconsolidated and nearly horizontal beds of greensand marl, clay, sandy clay, and gravel. This material has been modified by the elements, forming soils that are easily tilled and light in texture, with the light loams, sandy loams, and loamy sands predominating. The Sassafras series has a light brown to yellowish color, with sub-soil of bright yellow to reddish yellow color. The upper sub-soil may be heavier than the surface soils, but the lower surface soils are usually lighter, grading into sand or gravel. This usually helps to insure good drainage.

The Collington soils have a brown to a reddish brown surface, and a yellowish brown-yellow or greenish yellow upper subsoil, changing to a dark green or olive green sub-soil of the heavier members. These soils are derived from greensand deposits made along the Coastal Plain Province.

The Colts Neck series shows a brownish red to dark red colored surface soil and a deep or bright red colored sub-soil. The subsoil is light in texture. Of the three series, Colts Neck is not so well adapted to potato production as are the Sassafras and Collington. Its soils are inclined to be more droughty, and are better adapted to the early truck crops, while the high content of iron makes a rough potato skin. All these soils are easily tilled, and lend themselves well to successive growing of a cultivated crop, such as potatoes, as long as the organic matter is maintained through the use of cover crops. In fact, some of these soils are so light that it is necessary to have a growing crop upon them in the form of a cover crop to prevent their blowing during the winter. Again, their physical character allows them to be worked early in the spring and very shortly after a rain. They thus afford a more regular and better distribution of labor than would be possible on a heavier soil. The farmer need not wait such a long period of time after a rain until he can resume his tillage, and again he can get upon his soil early in the spring, as well as do part of the plowing during the winter months in some seasons. This is an important item for a crop which requires or is given intensive culture such as the potato in this region. Most farms have more than one soil type upon the place, and usually the soils or soil types best adapted to the potato crop are given over to this industry. The remaining portion of the farm is devoted to other crops, which usually comprise hay, corn and rye. In spite of the fact that land values are high in this area, there remains a relatively large proportion of uncropped acreage per farm. For the owner farms this amounts to 25.8 per cent. of the total farm area, and for the tenant farms 30 per cent. Some of this land is used for roads, lanes and buildings, and the remainder is a waste land temporarily uncropped, with a very small area of woods and pasture. However, the amount of uncropped area is surprisingly large, when we consider the high value of this land. But, due to the fact that these soils are easily tilled, dry off quickly after a rain, are naturally fertile, are suitable for successive cropping of a cultivated crop so long as the organic matter is maintained in the soil, they lend themselves admirably to specialization, and intensive as well as extensive culture of the potato.

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[1] U. S. Dept. Agr. Bur. Soils, Advance Sheets, Field Operations, 1913.

(See Figs. 2 and 3, following page 16.)

## CROPS

No definite system of rotation is followed on these potato farms. Wherever some system is practiced, the rotation may consist of potatoes one or more years, hay one or two years, and corn one year. Another system which is quite largely used consists of potatoes one or more years, rye or wheat one year, hay one or two years, and corn one year. Again, others attempt no rotation at all, and crop potatoes on the same area for an indefinite period. In such a case, corn, rye or wheat, and hay, may be rotated on other fields. However, the custom of raising potatoes continuously on the same area appears to be growing, and this practice restricts the potato area from the rotated portion of the farm. This is comparable to the use of alfalfa on most of the farms in other regions. The area, for the time it is occupied by the crop, is thrown out of the rotation as long as the crop is successful. It is not uncommon to find a portion of the farm growing potatoes continuously, while in another part potatoes are used in a tentative rotation with corn, rye or wheat and hay. That the farmers of this section are able to grow potatoes continuously on the same area is due to their systematic use of cover crops and heavy fertilization. While this system appears to militate against all rotation principles, both from the standpoint of agronomy and farm management, yet these farms are very successful in maintaining their potato yields and in handling their labor economically. Thus it is a system peculiar in itself, but apparently adapted to the conditions as described in this area.

On these 370 potato farms there were 29,156 crop acres. The areas devoted to each crop are shown in Table II:

**Table II.—Acreage of Crops on 370 Potato Farms in Monmouth County, New Jersey.**

| | Potatoes. | Corn. | Hay. | Rye. | Alfalfa. |
|---|---|---|---|---|---|
| Owners, | 5,151 | 2,451 | 2,913 | 1,543½ | 128¼ |
| Tenants, | 4,650 | 2,306 | 2,914 | 1,516½ | 187½ |
| Part Owners, | 624 | 274½ | 389 | 140 | 19½ |
| Total, | 10,425 | 5,031½ | 6,216 | 3,200 | 335¼ |

| | Wheat. | Apples. | Peaches and Pears. | Truck. | Total. |
|---|---|---|---|---|---|
| Owners, | 534½ | 616 | 146½ | 675 | 14,159 |
| Tenants, | 651 | 686½ | 100 | 334 | 13,349 |
| Part Owners, | 69½ | 70 | 23 | 38½ | 1,648 |
| Total, | 1,255 | 1,372½ | 269½ | 1,047½ | 29,156 |

Of the total crop acreage, over one-third is in potatoes. Hay follows with about one-fifth, while corn is third with one-sixth of the area. Rye ranks fourth with a little over one-tenth, followed by apples and wheat, each with about one twenty-fifth of the area. Alfalfa and peaches each occupy about one per cent. of the total crop acres. One twenty-fifth is devoted to truck, comprising asparagus and various other crops.

The proportion of these different crops does not vary materially among the farms of the owners, part owners, and tenants. However, the tenants have a smaller proportion in potatoes and a larger proportion in hay and small grains. This is not surprising when it is recognized that the potato corp requires a large cash surplus upon which to do business and is a more risky crop. Hence, unless the landlord finances the tenant, he is frequently unable to make the necessary heavy investment for seed and fertilizer.

Table III.—Area of Various Crops per Farm on 370 Potato Farms in Monmouth County, New Jersey.

| Crop. | Owners. | Tenants. | Part Owners. | Average. |
|---|---|---|---|---|
| Potatoes, | 26.5 | 29.9 | 31.3 | 28.2 |
| Hay, | 15.0 | 18.7 | 19.5 | 16.8 |
| Corn, | 12.6 | 14.8 | 13.7 | 13.6 |
| Rye, | 8.0 | 9.8 | 7.0 | 8.7 |
| Apples, | 3.2 | 4.2 | 3.5 | 3.7 |
| Wheat, | 2.6 | 4.2 | 3.5 | 3.4 |
| Alfalfa, | 0.8 | 1.1 | 1.0 | 0.9 |
| Peaches, | 0.8 | 0.7 | 1.0 | 0.7 |
| Truck, | 3.5 | 2.1 | 1.9 | 2.8 |
| Total, | 73.0 | 85.5 | 82.4 | 78.8 |

Though we find most of the staple crops grown on these potato farms, the majority produce sufficient only to supply feed for their work stock, a few cows, hogs and chickens. The corn and hay are fed almost entirely to the stock, while the wheat and rye are used for feed and cover crop seed.

A larger proportion of rye is sold than of any other staple crop with the exception of potatoes. Some farmers practice selling rye in the bundle at a fixed price per ton, including straw and grain. Other thresh the crop, sell the straw separate or use it for bedding, keep sufficient grain for their cover crop and dispose of the remainder.

Although the average farm acreage devoted to orchards is comparatively large, the majority of the orchards are only for family use. A limited number maintain commercial orchards, but not as a main source of their income. This has increased the average so that it appears rather high. For the year in which the survey was taken most of the orchards showed little or no profit. Many of those who were making an effort to diversify with fruit were becoming discouraged with the markets and the returns received from fruit. Evidently, potatoes were proving more profitable than fruit, and less risk appears to be entailed in potato farming.

A number of farms produce some truck on the lighter soils. This chiefly comprises asparagus, sweet corn, tomatoes and a few peppers, carrots and turnips. For some farms this furnishes considerable revenue, but it appears to be limited to the soils too light for profitable potato production in the majority of cases.

Thus the truck growing is regulated to a large extent by the soils and soil types.

The area of alfalfa is quite small on these farms, averaging less than one acre per farm. Of this the owners have a slightly smaller area per farm than the tenants and part owners. However, the merits of alfalfa are just becoming known among these farmers, and they are only recently learning to handle the crop successfully. As soon as the proper handling of alfalfa is better understood by all the farmers, it may come into far greater prominence in this area. By the more common use of alfalfa the acreage needed to grow sufficient hay to feed the work stock can be decreased, leaving a larger area for potatoes and corn or rye. Again on these light soils, timothy and other grasses are not highly productive, so that a good substitute for forage obtained from the grasses would be alfalfa. Furthermore, alfalfa is well adapted to succeed potatoes, since the destruction of weeds by the thorough cultivation such as potatoes ordinarily receive, prepares the seed-bed well for the alfalfa seeding. After the potatoes are dug, without further plowing, the area can be limed, harrowed and seeded with a minumum amount of labor and expense.[1] Thus this crop should become far more important in the future on these farms.

## FARM PRACTICE

The farm practice of these farms is unique, as we would expect in such a type of farming. In many respects individual practices differ, but the method of handling the potato crop is rather uniform.

The basis and means of maintaining such an intensive industry depend to a large extent on the universal use of cover crops. There is no area in the State where cover crops are given such careful attention as on these potato farms. It is only through this practice that the farmers are able to maintain soil fertility. In many instances the fertility and acre production appear to be increasing rather than decreasing where the cover crops are skill-fully handled. Wheat, rye and crimson clover are the most common cover crops. But some crimson clover is seeded alone, at the rate of a peck or a half of a bushel to the acre. Others use 1½ to 2 bushels of rye, while many use wheat. A large number combine crimson clover with rye or wheat, using 4 to 8 quarts of crimson clover with 1 to 1½ bushels of either rye or wheat. This makes a better cover crop because of greater growth of the wheat or rye, combined with the value of the clover in adding nitrogen. Furthermore, the rye or wheat protects the clover so that it will live through the winter more successfully than if seeded alone. Some of the larger growers who do not finish digging until quite late, omit the clover and use only rye or wheat, since the late season allows for little development of the former. Therefore, to some extent the time of digging influences the nature of the cover crop used. For the latest seedings rye is more commonly used since it is more hardy than wheat and will give a more satisfactory cover when seeded late. Wheat appears to be more popular for the earlier seedings. It makes a more leafy growth, and if the spring plowing is delayed it does not make such a rapid growth in the spring. Some of the fields will not grow crimson clover successfully, probably because of need of lime. Though this clover will stand a certain amount of acidity, it will eventually be driven out of acid soils.

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[1] Furthermore, the season's tillage given the potatoes tends to form an ideal seed-bed for the succeeding alfalfa. This thorough cultivation given the potato crop makes a fine loose surface soil to a depth of two or three inches and leaves the lower soil compact and firm as is desirable for a good alfalfa seed-bed. Thus we have a fine loose mulch on the surface, free of weed seeds, overlying a firm compact soil underneath. This compactness establishes the capillarity, making the upper surface inches of soil more moist and affords surer germination and more vigorous autumn growth, than is ordinarily obtained when the seed-bed is prepared from rye or wheat stubble.

Thus at a cost of $1 to $3 per acre for cover crop seed, together with the use of chemical fertilizer, it appears possible to maintain the organic content of these soils and keep them productive for continuous cultivation of potatoes.

This system is independent of the use of live stock which is almost universally looked upon as necessary in maintaining fertility. Neither do these potato growers, as a rule, buy or apply manure as is frequently the custom among truckers.

When potato ground is seeded to rye or wheat it is not necessary to replow but merely to prepare by harrowing and to seed the crop. This makes it economical in the use of labor as well as in the use of fertilizer. Unless the potato ground is quite light, sufficient residual fertilizer will be left after the potatoes are dug to grow the rye or wheat without additional application of fertilizers. Sometimes grass for the next year's hay is seeded after potatoes, without plowing, but by preparing with the harrow only, in the same manner as for the seeding of alfalfa.

On some of the lighter sandy land, cowpeas are seeded, plowed under and the area seeded to rye. Yields on such areas are low, yet considerable straw is produced. Hay is ordinarily left in the rotation one year only. On these light soils it is not profitable to allow a field to remain in grass after the clovers have died out.

(See Figs. 4 to 18, following page 16.)

## FERTILIZERS

The potatoes are given the major portion of all the commercial fertilizers purchased. This is an important charge against the crop for the application is heavy. The usual amount is 1,200 to 1,800 pounds per acre. This is applied in the row at the time of planting the potatoes. In this way labor is saved over the separate application as followed in some potato-growing regions. The rye is lightly fertilized when it does not follow potatoes. On the lighter soils fertilizer is used at the rate of 200 to 400 pounds per acre for rye. Corn is frequently fertilized at the rate of 300 to 400 pounds of commercial fertilizer per acre. On the corn much of the manure obtained from the stock is applied. The grade of fertilizers most commonly used is one showing an analysis of 4–8–10, *i. e.,* 4 per cent. of nitrogen, 8 per cent. of phosphoric acid and 10 per cent of potash. As a potato fertilizer it is of a higher grade than that used in the Maine potato region where a 5–8–7 grade is used. The Maine growers have increased their nitrogen 1 per cent. over the New Jersey growers, but cut the potash down 3 per cent. It would be expected that the Maine growers need more nitrogen in their fertilizer since they do not grow cover crops to plow under, but use a rotation of potatoes, oats and clover, each one year. The clover is harvested for hay, leaving a clover sod to plow under for potatoes. Evidently, this sod will not furnish as much nitrogen under conditions in Maine as the cover crop of the Monmouth County farmer does under conditions in New Jersey. Whether the high application of potash is needed for New Jersey conditions is a debatable question. Since this survey was made, the influence of war on the cost and supply of potash has necessitated a much smaller application of potash with apparently good results. Recent work done by the Monmouth County Farm Bureau indicates an excessive use of potash when applied in the proportion of 4–8–10. Further work is needed to determine this matter definitely.

The fertilizer used for the corn is usually a 2–8–10 or some potato fertilizer, and the same is used for rye. A very limited amount of top-dressing for hay is practiced, nitrate of soda being used frequently for the purpose.

## MONMOUTH COUNTY FARMERS' EXCHANGE

The development of this great potato industry has given rise to a very successful and well-known organization, the Monmouth County Farmers' Exchange, composed of potato producing farmers. So phenomenal has been its success that it is known all over the eastern states and cited as an example of a successful farmers' organization for buying and selling the farm products of its members. These potato farmers have solved their own market problem in a very efficient and expedient manner. This publication would not be complete without a brief description of this well-known farmers' exchange.

Unlike many potato growers, the Monmouth County potato farmers sell practically all of their crop direct from the field. This throws on the market a large amount of potatoes from a small area in a short space of time. Consequently, unless the marketing of such a product is handled systematically, there is sure to be great fluctuation in price. Such were the existing conditions in the county several years ago. The price of potatoes is said to have varied as much as 40 cents a bushel in a single day. Quite frequently the prices changed three or four times a day and dropped to 25 cents a bushel during the day. At that time each loading station had a buyer representing chiefly New York and Philadelphia firms, who bought on commission for about 10 cents a barrel.

With the increased production of potatoes, conditions continued to grow worse and the marketing of the potato crop was very unsatisfactory. At a meeting of the Pomona Grange held at Keansburg in 1907, a committee was appointed to investigate the markets. In the fall of 1907 a committee was sent to visit the Produce Exchange of the Eastern Shore of Virginia. The committee brought back a very promising account of the Eastern Shore of Virginia Produce Exchange. They persuaded the manager to come to Freehold, and address the Monmouth County farmers in the Court House that winter. Through these efforts an organization was formed in March, 1908, under the corporation laws of New Jersey, with an authorized capital stock of $100,000. Shares were issued at $5.00 a share with a 20-share limit. A paid-in capital of $7,000 was obtained the first year. Officers including a president, secretary, treasurer, manager and eleven directors were elected. Each director represented one of the principal loading stations in the county.

The first year the total business amounted to $454,414.11,

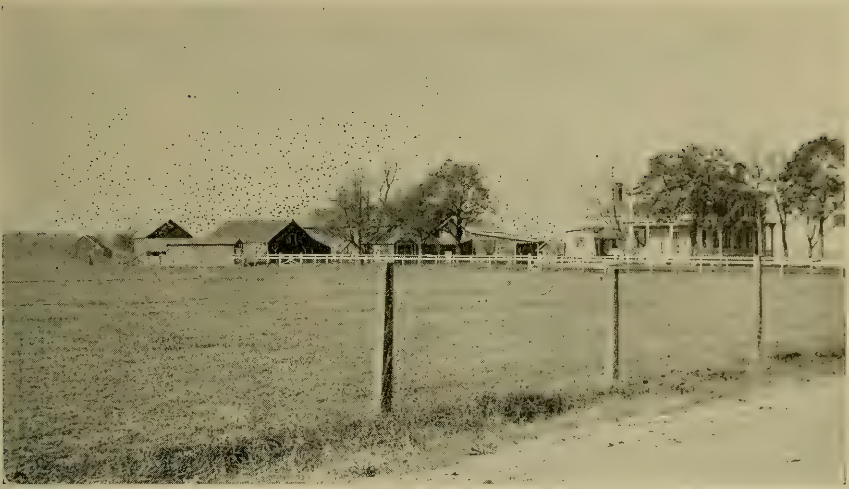

Fig. 2.—A Typical Group of Farm Buildings in Monmouth County, New Jersey.

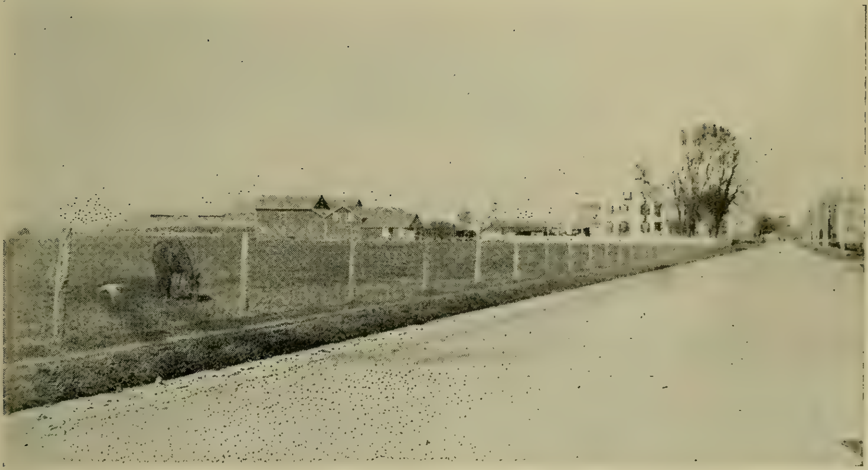

Fig. 3.—View of a Monmouth County Farm, Showing the Good Dirt Road, Typical of the Region.

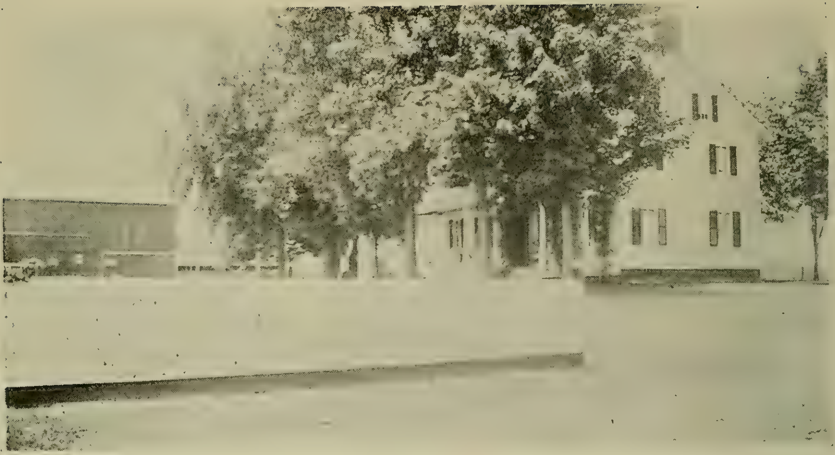

Fig. 4.—A Monmouth County Farmhouse.

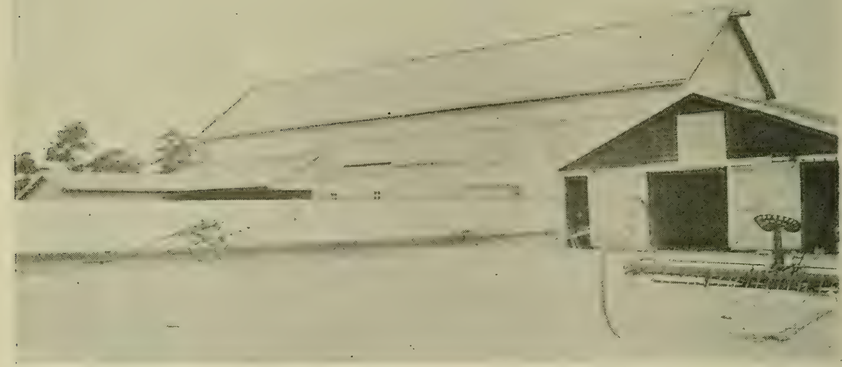

Fig. 5.—View of Outbuildings on a Monmouth County Farm.

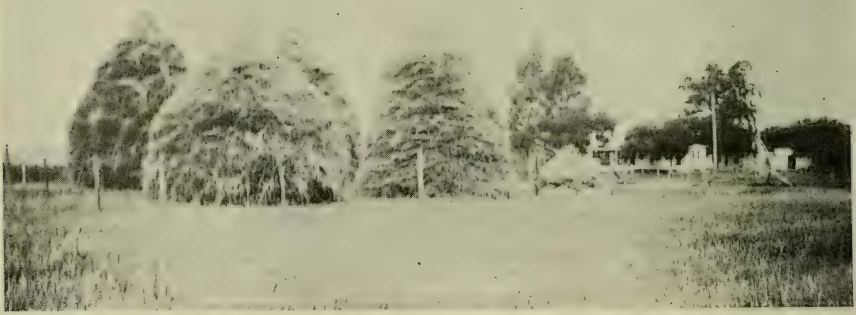

Fig. 6.—Rye Stacks on a Monmouth County Farm. When there is Not Room to Store All the Grain in Buildings, it is Commonly Stacked in the Fields.

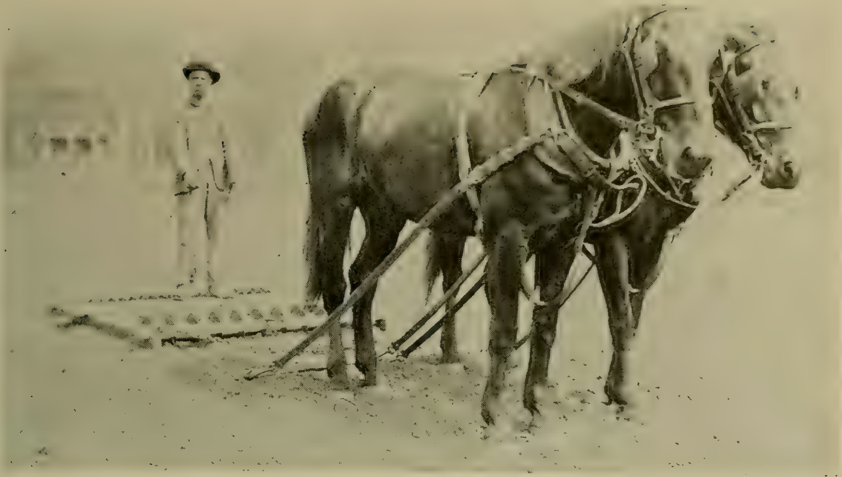

Fig. 7.—Putting on the Finishing Touch in the Preparation of the Soil for Potato Planting, Using a Meeker Smoothing Harrow.

Fig. 8.—Potato Planting Time on a Monmouth County Farm. Thorough Preparation of the Soil, Generous Use of Chemical Fertilizers, and Constant Cultivation Resulted in a Yield from this Field of 370 Bushels per Acre, with 5 Per Cent. of Potash in the Fertilizer.

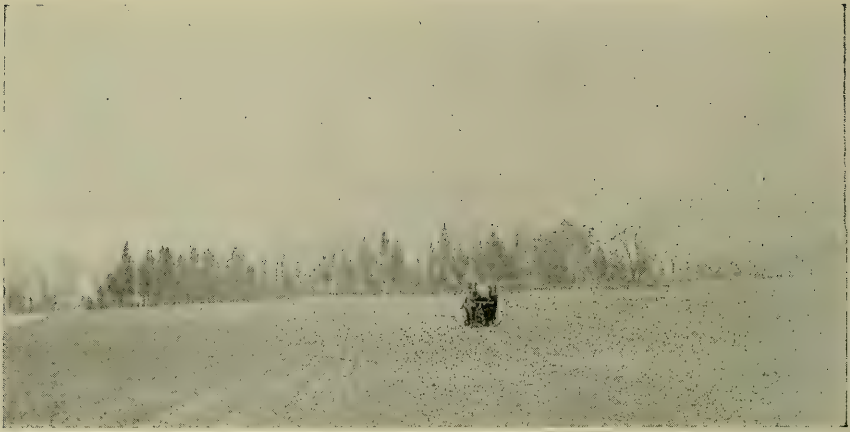

Fig. 9.—A Well-prepared Field, Showing the Ridge Thrown Over the Rows to Protect from Frost and Freezing, as Well as to Indicate the Row.

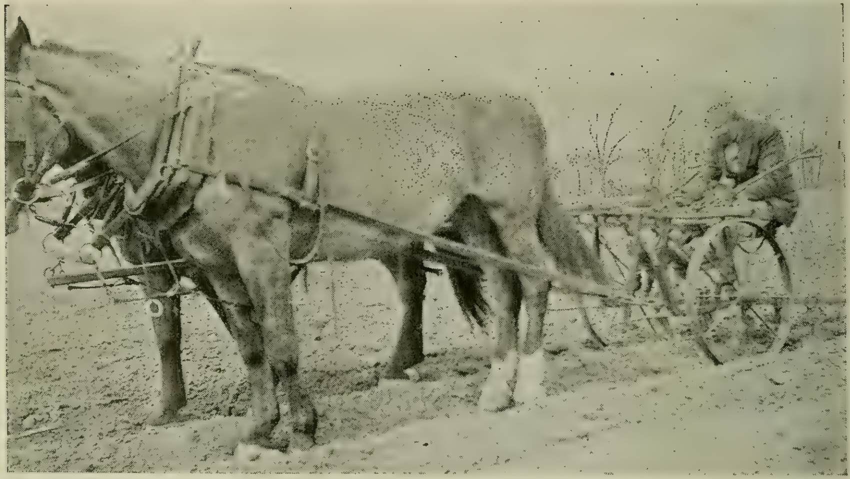

Fig. 10.—The First Cultivation, Showing the Cultivator Teeth Reaching to the Bottom of the Plowed Layer.

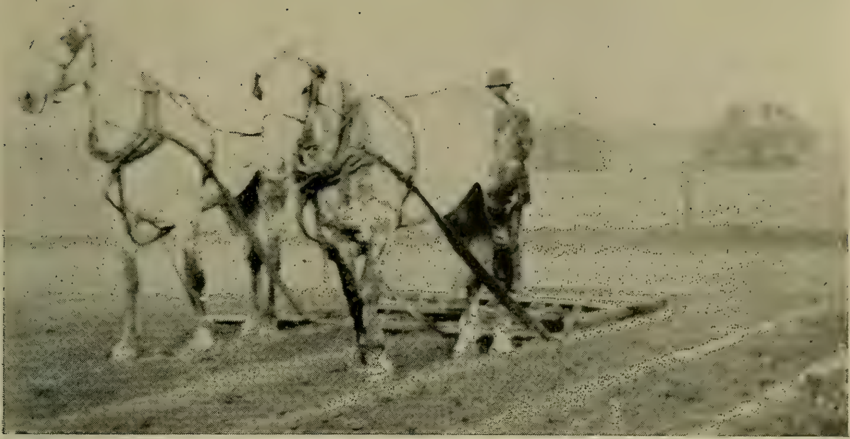

Fig. 11.—Levelling the Ridges, After the First Cultivation, with the Meeker Smoothing Harrow. The Potatoes Are Not Yet Up.

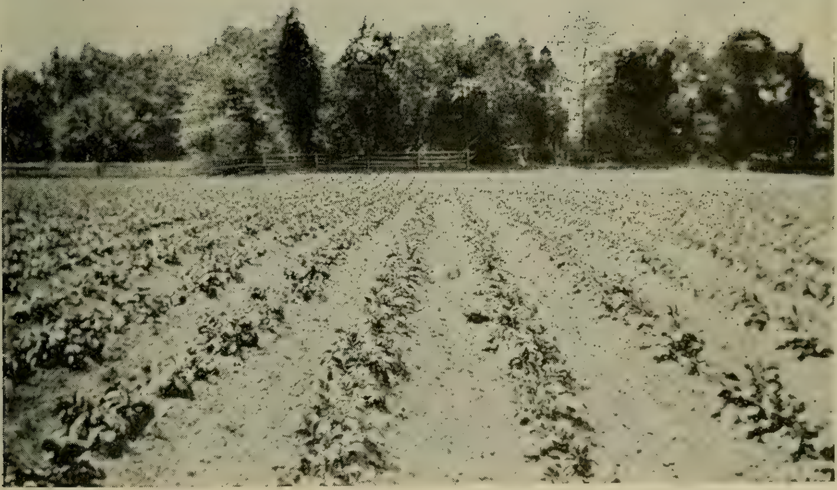

Fig. 12.—Eight Weeks After Planting; Plants About 6 Inches High.

This Field Yielded over 400 Bushels to the Acre with only 2 Per Cent. of Potash in the Fertilizer.

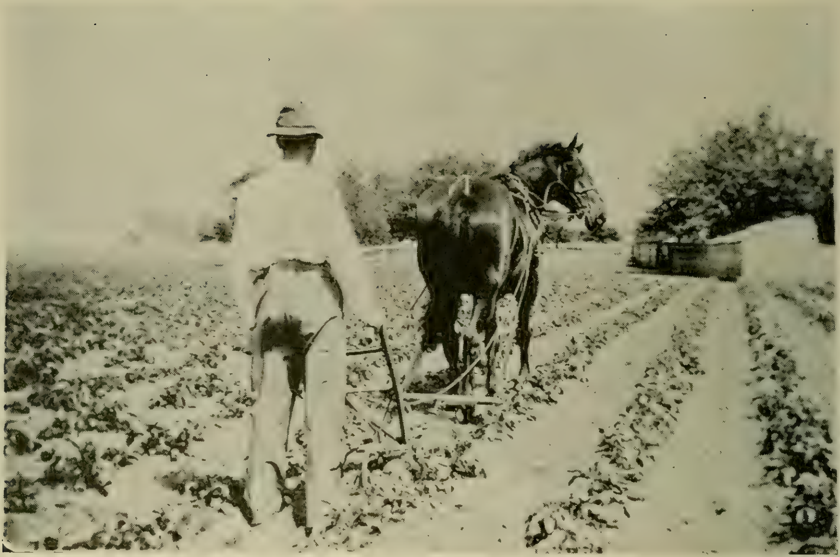

Fig. 13.—Cultivation with the One-horse Cultivator When the Plants Are 6 Inches High.

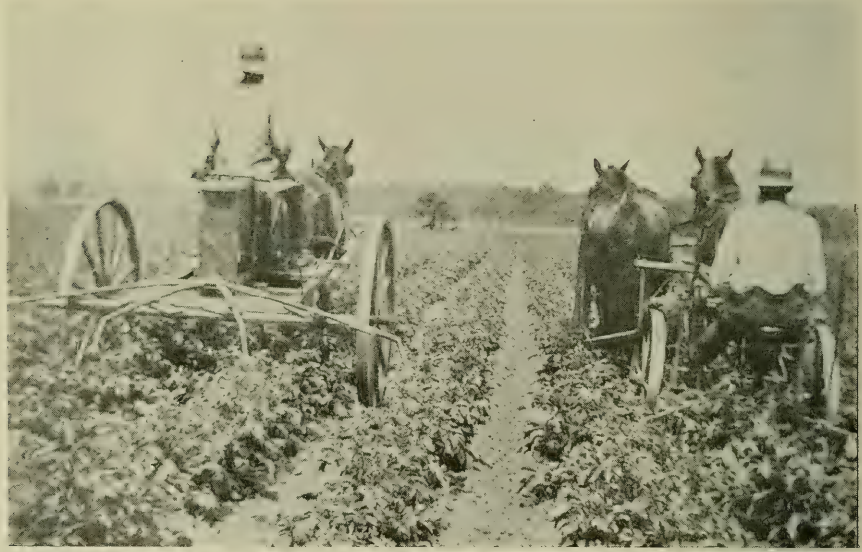

Fig. 14.—Dusting with Paris Green and Cultivating with a Two-horse Riding Cultivator. Careful Cultivation Keeps Down Weeds and Should Make Hoeing Unnecessary.

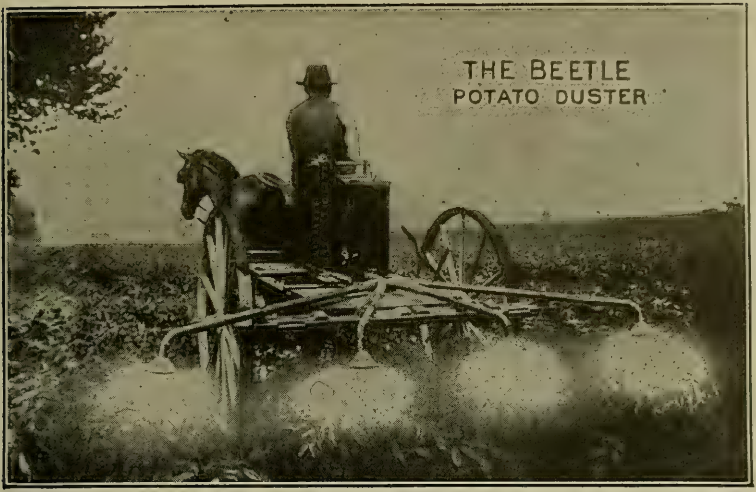

Fig. 15.—The Potato Beetle Duster in Operation.[1]

[1] Used by courtesy of Leggett and Bro., New York.

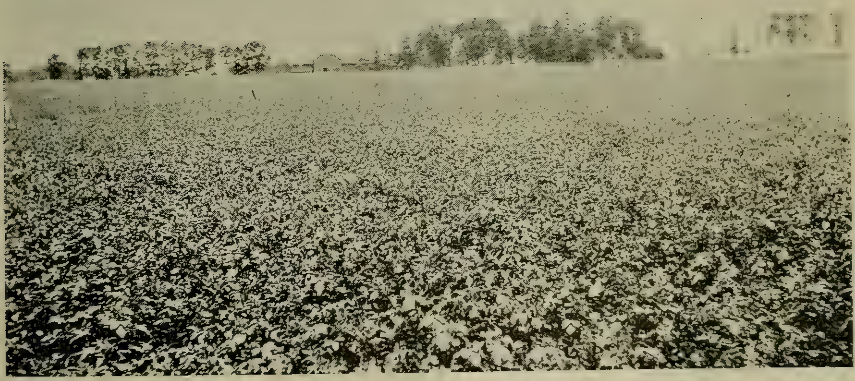

Fig. 16.—Looking Down the Rows of a Potato Field on the Farm of H. V. M. Dennis, President of the Monmouth County Farmers' Exchange, Freehold, N. J. A Solid Mass of Luxuriant Vegetation.

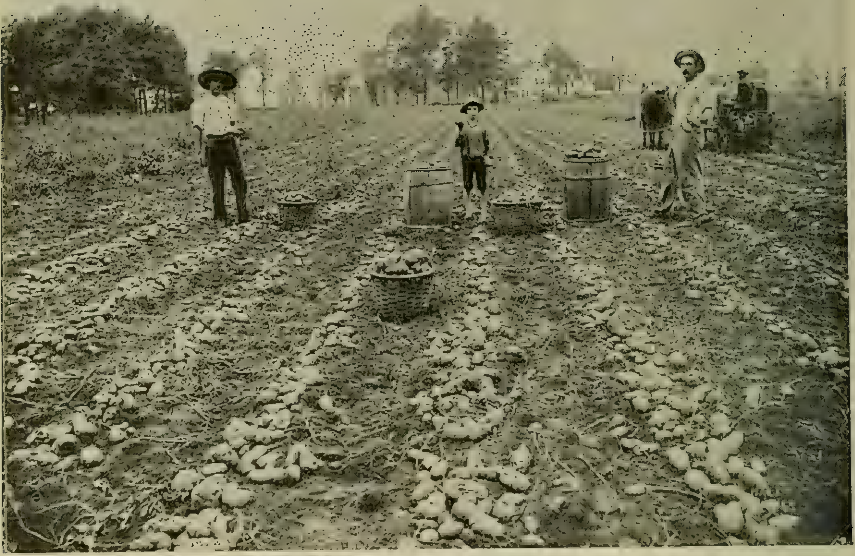

Fig. 17.—Digging Giant Potatoes on a Monmouth County Farm.

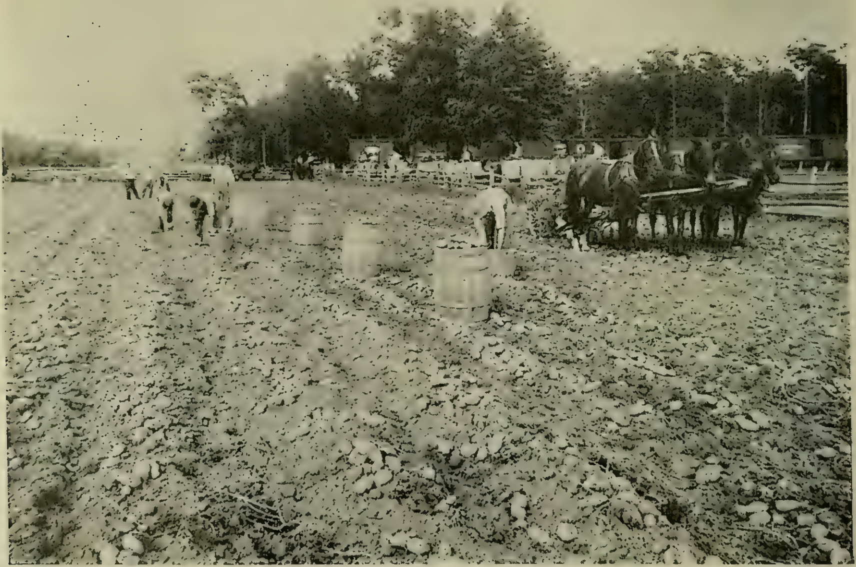

Fig. 18.—Potato Harvesting Scene on a Monmouth County Farm, Showing Methods of Digging, Picking, Carting and Loading on Freight Cars.

representing 2,011 cars, containing 203,000 packages of potatoes, vegetables and fruit. It was soon found that $7,000 was not sufficient with which to do business, so the Board of Directors gave themselves as security for money borrowed to carry on their business. This made possible cash transactions, which they deemed the only satisfactory method of doing business.

Since the potato dealers could no longer manipulate the price of potatoes in the area where the Exchange was operating, they went to the adjacent territory of Prospect Plains, Cranbury, Hightstown, Plainsboro, Princeton Junction, Lawrence Station, Robbinsville and all the adjacent territory and bought potatoes cheaper than was possible from the Exchange. As this was derogatory to the Exchange sales, this territory was equipped with scales and offices at the different stations until the whole potato area was covered by the Exchange. This gave the organization control of the whole area and it was no longer at the mercy of the buyers.

The Exchange is in touch with all the markets through telephone and telegraph. During the potato harvesting season the services of a telegraph operator, stationed in the central offices, are secured and direct communication is kept up with the markets. By this means the managers are able to locate the best markets. When we consider that the Monmouth County Farmers' Exchange sells potatoes to almost every state in the United States and ships to Europe, as well, it would appear as though it is handling the marketing problem in a very able manner.

The method employed is to sell the potatoes throughout the day, and at night to average the price for the American Giants and for the round stock such as Cobblers, Norcross and Gold Coin. The round stock is handled as a separate class from the long stock. The farmer gets the average price of the day's sales less the cost of selling. In this way the farmer gets the market value of his product. Yet the fact that the farmer does not know what he will get for his potatoes when he hauls them to the railroad, has a tendency to keep him from being loyal to the organization, for he usually wants to know exactly what he will get for his crop. As a rule, the farmers do not grade the potatoes so that they can be sold as different brands, but it is the hope of the Exchange that it can eventually have the farmers adopt some system whereby uniform grading can be accomplished, and specific brands put on the market.

Most sales are made by draft, bill of lading attached. The Exchange regulates the rate of digging by informing the farmers whenever the market is becoming overloaded. This prevents a glut on the market and keeps the prices at a more uniform level. The manager of the Exchange can tell 24 to 48 hours in advance by the tone of buying when there will be a break in the market. Thus he can warn the farmers not to dig for a few days, when it may be expected the market will again be strengthened. Again, at times when the weather is too hot to dig in order to get the potatoes on the market in good condition, it is necessary to delay harvesting until it becomes cooler.

The Monmouth County Farmers' Exchange not only sells potatoes, some fruit and vegetables, but it keeps its capital, equipment and officers working the year round by acting as a purchasing agent for the farmers. About the most important article purchased is fertilizer. In 1915 the Exchange sold over 7,000 tons to its members. Three warehouses have been erected in the territory for mixing and storing the goods until it is distributed. The customers not only know the analysis but also what is used to make up the analysis of the brand. For the year of 1916 two formulas were used, one with and one without potash, as follows:

No. 1.

*4–10–2.*

| | | |
|---|---|---|
| 150 | lbs. | nitrate of soda. |
| 120 | “ | sulphate of ammonia. |
| 30 | “ | blood. |
| 280 | “ | tankage. |
| 100 | “ | bone. |
| 80 | “ | potash. |
| 1240 | “ | acid phosphate. |

No. 2.

*4–10–0.*

| | | |
|---|---|---|
| 150 | lbs. | nitrate of soda. |
| 100 | “ | sulphate of ammonia. |
| 30 | “ | blood. |
| 350 | “ | tankage. |
| 100 | “ | bone. |
| 1270 | “ | acid phosphate. |

For 1915 sufficient potash was obtained for a 5 per cent. mixture, but this year only sufficient to make one brand 2 per cent. potash could be secured. When potash is sold at a normal price the usual potato brand used is a 4–8–10 mixture, instead of a 4–10–2 brand. To these potato growers who usually apply about 1,500 pounds of fertilizer on each acre of potatoes, this is a great item of expense, as well as of much importance to the successful culture of the crop. In addition to the purchasing of fertilizer, the Exchange buys the major portion of the seed potatoes for its members. These are obtained from New York State and Aroostook County, Maine. In order that the best seed free from disease be secured, the inspector of the Exchange visits the field from which the potatoes come, to see if they grow true to type, are vigorous and free from disease. Two inspections are ordinarily made, one during the growing season and one at the time of digging. This enables the members to obtain a higher quality of seed and one more free from disease than if they were dependent upon the seed dealers, who would not have the same means of inspection. All sales are made on cash basis or a well-secured note.

The paid-in capital stock of the Exchange is $75,400 composed of shares the par value of which is $5.00 each. The stockholders are allowed one vote for each share held. No more stock will be sold, but participating membership can be obtained by paying a $5.00 membership fee. The total membership at present is about 1,400.

The business has grown from 203,000 packages, valued at $454,414.11, in 1908, to 986,594 packages, valued at $1,254,613.49, in 1915. This is a wonderful development, and a record of service of which any organization might be proud. At the present time it is estimated that the Exchange handles half of the total output of potatoes in the county. Any organization which can handle so efficiently a bulky product such as potatoes and fertilizer at so small a cost as 2½ per cent. deserves much commendation. Should the farmers all use this Exchange to market and buy their products, this percentage cost could be still more decreased. However, the amount of business and influence of the organization is steadily increasing, and it is only a matter of time until all the farmers will recognize its merits more fully. The success of the Monmouth County Farmers' Exchange is due largely to the men who are its officials. The character and caliber of the men at the head of the organization is displayed by the fact that during the first year the Board of Directors and officials met over forty times without any pay, and even at their own expense. The men at the head of the organization are composed of the most stable and influential men of the county. The president of the Exchange, Mr. H. V. M. Dennis, who has served since it was organized, has given much time and thought to the work in order that it should be made a full success. Thus through the loyality and ability of the officers and members it has been made an example of the great possibilities to be obtained through co-operative buying and selling when farmers will unite for a common purpose and remain loyal to that purpose.

## EXPLANATION OF TERMS AND METHODS USED

The reader should thoroughly familiarize himself with the following terms before reading the remainder of this publication:

*Owner.*—The term "owner" is applied to the person who operates the farm he owns.

*Part Owner.*—The term "part owner" is applied to the person who owns the farm, rents additional land, and operates both that which he owns and rents.

*Landlord.*—The landlord is a person who owns a farm and leases it to another.

*Tenant.*—The tenant is the person who leases the land from the landlord.

*Share Tenant.*—The term "share tenant" is applied to the person who leases a farm for a share of the crops and stock receipts, usually one-half, and furnishes the working tools, equipment, work stock, and ordinarily half of the productive stock.

*Cash Tenant.*—This is the term applied to the tenant who leases the land for a stipulated cash sum, furnishes all his stock and working equipment, and obtains all the receipts.

*Labor-Share Tenant.*—This term is applied to the tenant who furnishes no equipment or capital, all of which is furnished by the landlord, the tenant usually receiving one-third of the crop and stock receipts.

*Farm Capital.*—Farm capital includes all money invested to carry on the farm business. It is the amount of money invested in land, building, machinery, stock, supplies and cash necessary to conduct the farm operations. It does not include house furnishings. The capital invested is the average of the values for the beginning and the end of the year.

*Farm Receipts.*—Farm receipts include all money received from the sale of crops, stock, stock products, miscellaneous sources, such as outside labor, and increase of inventory, if any increase occurs.

*Farm Expenses.*—Farm expenses include all money paid out to conduct the farming business. This embraces such expenses as board furnished, seed, fertilizers, taxes, insurance, buildings, improvement, equipment, and decrease of inventory, if any. It does not include expenses for the household.

*Farm Income.*—Farm income is the term applied to the total farm receipts less the total farm expenses. It is what the farmer has earned with his own labor and capital invested in his farm business.

*Labor Income.*—By "labor income" is meant the farm income less 5 per cent. interest allowed for the use of the capital invested in the farm business. Thus it is equal to the total receipts, less the total expenses and 5 per cent. of the average capital invested. In addition to this the farmer has a house to live in and products for household use, such as garden vegetables, fruit, butter, milk, eggs, meat and various other articles obtained from the farm. It then represents what the farmer has for his time and labor for the year on the farm exclusive of the value of his house (as his dwelling) and farm products for household use.

*Work Unit.*—A work unit for horse or man represents a day's work. Ordinarily, farm operations require a certain number of days' work, or work units. Should it take one farmer longer to do the same amount of work than another, he is not as efficient in the use of his labor. Work units may be used to measure the efficiency of both men and horses.

*Animal Unit*—An animal unit represents a cow, a horse, or its equivalent in the amount of feed required and manure produced.

*Farm.*—A farm in the sense used here represents all the land operated by one operator and from one center.

## METHODS OF CALCULATING RESULTS

All conclusions are drawn from the results shown by a number of farms, selected for a certain factor or character common to all of the number. The work is more representative if a large number of farms are used in obtaining the figures with which to draw the conclusions. Usually other factors influencing results are sufficiently distributed to make the particular factor isolated, the only one to influence the profits or loss of the farms. Nevertheless, it is essential that the calculator be careful that other factors may not be so correlated as to influence the work. This can readily be ascertained by careful observation of the records, and averaging factors such as size, capital, production, distance from the railroad station and others of importance. When these other influencing factors are the same for all the divisions made of the records, then conclusions arrived at can be relied upon for their accuracy.[1]

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[1] For example, if we wish to study the effect of size on labor income we might take 40 farms alike in yield per acre, distance from the railroad, and with the same amount of capital when they are averaged. But 20 of these farms are between 50 and 73 acres, averaging 62½ acres, and 20 farms are from 75.1 to 100 acres in size, with an average of 87 acres. Then size is the only factor influencing the returns for each 20 farms, for all the other factors are alike, or nearly so. By getting the average labor income for each class of these twenty farms we would have the effect that size has upon profitable potato production. All other factors are eliminated since they average alike.

## DEPRECIATION

All industries must allow a certain amount for depreciation. This can be charged up as an expense against the year's business. For some industries this has been definitely worked out so that a standard rate may be charged. Unfortunately, arbitrary rates of depreciation cannot be charged against individual farms, different types of farms, or farms in different localities. Depreciation in live stock is obtained by taking their value at the beginning and at the end of the year. Depreciation of machinery was obtained for these farms by taking the total cash expense for the machinery repair. This was added to the cost of new machinery purchased, and the sum divided by the machinery value. This gave a rate of 11 per cent. to be charged against each potato farm for cost and depreciation in the use of machinery. While this method may not be applicable to a small number of farms or for extension work, it is quite accurate for investigational work, where a large number of farms are used. For all these potato farms a charge of 11 per cent. of the machinery value was made as a farm expense for the year. This same method could be used to determine the building depreciation, but farmers do more repairing of their buildings with their own farm labor. Therefore, the figure obtained by this method for depreciation on buildings may be low, as the direct cash expense does not always represent the total repairs made on the buildings. Probably as just an estimation as possible of depreciation of buildings can be obtained by the same method as that used to determine machinery depreciation, but the figure obtained cannot be considered the true rate of building depreciation. However, this method can be used to determine a uniform rate to be charged for depreciation of buildings. These methods eliminate all estimation as to what depreciation is or would be. They are figures obtained from expense actually incurred and not estimated. For the owner farms the rate of building depreciation as determined was 3.6 per cent., and for the tenant farms 2.9 per cent., or an average of 3.3 per cent. for all the farms.

## FAMILY LABOR

All family labor other than that of the operator is charged as part of the current expense. A farmer, who has two or three sons at home, each of whom takes the place of a man, will often have a cash surplus to put in the bank, but if he were compelled to hire and pay for the labor done by his sons, he would not have a surplus of cash at the end of the year.

## WHAT CONSTITUTES A POTATO FARM

All farms with fifty per cent. or more of the total receipts from potatoes were designated as potato farms. While this is an arbitrary method of separation there were not very many farms on the border line. Since fifty per cent. or more of the receipts of these farms are from potatoes, this crop is unquestionably the dominating influence. In this report only potato farms so classified are included. From the whole county 370 potato farms were included out of the total number of 1,189. Of these 370 potato farms, 194 were operated by owners of the farms, 156 by tenants and 20 by part owners, or men owning a farm and renting additional land.

## SURVEY RESULTS OF SPECIALIZED FARMING COMPARED WITH THOSE OF GENERAL FARMING

There is always danger of drawing too definite conclusions from results of one farm year. This is true in regions where staple crops are grown and general farming is followed. It is not uncommon for one year to be more prosperous than usual and give greater returns to the farmer because of better climatic conditions, or high prices obtained for a certain article. The reverse may occur and the farmers could have an off year which would not be representative of their normal returns in other years. This fluctuation of seasonal and market conditions is far more severe for a specialized type of farming than for the more staple types. The total crop yield is more severely affected by climatic or seasonal conditions and the markets are more easily affected by over or under production. Therefore, much care should be used in selecting what appears to have been a normal year. Still better results would be reached if successive surveys were made for three or more years of the same farms. A farmer is in the business for a lifetime and conclusions drawn from an abnormal year's return may not be at all representative of his usual income. Therefore, survey results may be quite misleading if they are not made at the proper time. Misleading results are much more liable to be obtained from a specialized type of farming than from general types including dairying, raising live stock and the staple crops such as hay and grain. The year of 1914 was considered a normal year by the potato-growers of Monmouth County, New Jersey. By comparing the prices of potatoes in the county for the last seven years, we find the year of 1914 is normal for that period.

The following is the average price paid for potatoes by the Monmouth County Farmers' Exchange for 1914, the year in which this survey was made, and the two previous years, with the average for the last seven consecutive years, up to and including 1914.

Table IV.—Price of Potatoes per Barrel Paid by the Monmouth County Farmers' Exchange.

| Year. | Price per Barrel. |
|---|---|
| 1912, | $1.32½ |
| 1913, | 1.58 |
| 1914, | 1.42 |
| Average, | $[illegible]<br>1.44 |

AVERAGE FOR SEVEN YEARS UP TO AND INCLUDING 1914, $1.42

The average price paid by the Exchange in 1914 was ~~one~~ two cents below the average for the three years, and the exact average paid by the Exchange for the last seven consecutive years. Since the yield was considered a normal one for the region, and the price was the average of the last seven years, the results in this publication should be quite representative of normal returns to be expected in potato growing for this region. Duplication of the work for the six preceding years would not have altered results to any material extent. The year 1915 would show quite different results, for the yield was above the average, and prices were much below those of normal conditions. Again, the cost of fertilizer for 1915 was abnormal, due to the shortage of potash.

## LAND TENURE

### RELATION OF TENURE TO LABOR INCOME

Table V.—Profits Derived by Different Forms of Tenure from 370 Potato Farms in Monmouth County, New Jersey.

| Land Tenure. | No. of Farms. | Farm Income. | Labor Income. |
|---|---|---|---|
| Owners, | 194 | $1,801 | $917 |
| Part Owners, | 20 | 1,635 | 801 |
| Share Tenants, | 132 | 903 | 739 |
| Cash Tenants, | 15 | 1,102 | 938 |
| Labor-Share Tenants, | 7 | 766 | 726 |
| Cash and Share Tenants, | 2 | 488 | 411 |
| Average, | .... | .... | $842 |

The average labor income for these 370 potato farms is $842 per farm. This is one of the highest labor incomes found in any survey made up to the present time. When the large number of the farms is taken into consideration, it is the highest of any locality yet reported. Though surveys made in Indiana, Illinois and Iowa show a slightly higher labor income for the 370 tenant farms, the owners of this region are far below.[1] With the exception of the cash tenants, the owners are making the highest labor income of all classes of land tenure. The part owners rank second, the share tenants third, the labor-share tenants fourth, and the cash and share tenants fifth. This is a logical sequence and probably the correct relation of labor income to land tenure. The cash tenants are making a somewhat higher income than any other class, due largely to the fact that their cash rents are low compared with the amount they would be compelled to pay should they share receipts.

Though the owners make only $178 more labor income, they have far more money to spend for improvements, education and luxuries than the tenants. The amount actually left over expenses upon which to live is shown under farm income.[2] The owners have the extra returns from their capital, additional to their labor income. Thus the farm income of the owners is $898 greater than that of the share renters. Therefore, for every dollar the share renter can spend the owner can spend about two. The farm income of the owners exceeds that of the part owners by $166, of the cash tenants by $699, of the labor share tenants by $1,035, and of the cash and share tenants, $1,313. In addition to this farm income all these farmers receive from $400 to $600 contributed to their living from the farm. This amount represents their house rent, garden vegetables, meat, milk, butter, eggs, fruit and miscellaneous articles furnished by the farm.

When comparing the labor incomes of these farms according to the form of land tenure, they appear to bear the proper relation with all excepting the cash renters. These are returning the landlord less than 5 per cent. interest on his investment. This low rate allows the cash renters a higher labor income than would otherwise be possible. However, under normal conditions it is proper that owners should receive a larger labor income than tenants or part owners. Otherwise, it might be more profitable for them to sell their farms, invest their money in 5 per cent. bonds and become tenant farmers. Nevertheless, conditions in some parts of the United States are such that the tenants are making far higher labor incomes than the owners.[1] When land values rise to such a degree, they are excessive, and are not based on production but rather on speculation. It thus appears that land values in Monmouth County are normal and have not gone above their production values. This is a very desirable condition for a farming community and one that should be maintained. It is well that owners should receive a somewhat higher labor income than tenants, in order to afford a greater stimulus for tenants to become owners.

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[1] U. S. Dept. Agr. Bul. 41.

[2] Farm income is the amount the farmer has to live upon from his farm when his farm property is free of mortgage or debt.

## RELATION OF TENURE ON THE POTATO FARMS TO TENURE IN THE COUNTY AND STATE

Table VI.—Number of Owners Operating Farms Compared with Number of Tenants.

| Form of Tenure. | State of New Jersey. | Per Cent. | Monmouth County. | Per Cent. | Mon. Co. Potato Farms. | Per Cent. |
|---|---|---|---|---|---|---|
| Owners, .............. | 24,133 | 72.1 | 2,179 | 74.1 | 194 | 55 |
| Tenants, ............. | 8,299 | 24.8 | 630 | 21.4 | 156 | 45 |

This comparison is quite striking for it shows that on these potato farms there is a very high percentage of tenancy compared with that of the county or State. This condition is probably due to a number of factors and not to any one alone. In the first place, land values have increased more rapidly throughout this potato area than in surrounding portions of the State. This helps to make it more difficult for a young man to purchase a farm since far more capital is required than for many other types of farming. In many farming regions where the proportion of tenancy is high, the condition is due to speculation. In this potato area such is not the case. These farms are to a large degree owned by old families of the community, many of whom have retired to town and rented their farms to a tenant. This large proportion of tenancy can be attributed largely to the productiveness of the farms. When a region is occupied with farms that return a farm income of approximately $2,000 for the average farm it is quite possible for a large number of the owners to retire with a moderate amount of accumulated capital, which thereafter, with the income from their farm occupied by a tenant, will provide for a comfortable living. Also, there are but few farms in this area for sale. Hence, in view of all the prevailing conditions, the large proportion of tenant farms must be attributed to the large farm income and the difficulty of purchasing from these old residents, many of whom are now living in town as retired farmers.

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[1] U. S. Dept. Agr. Bul. No. 41.

The tenants receive over twice as much as their hired men and have in addition more independent living conditions. Thus, this status of land tenure is an outgrowth of local conditions and not a criterion of speculation as it exists in some parts of the United States.

## RELATION OF TENURE TO PER CENT. RETURNED TO THE OWNER

**Table VII.—Returns to the Landlord on Farms Occupied by Tenants or Per Cent. Received by Landlord on His Investment.**

| Tenure. | Labor Income Operator. | Per Cent. On Investment by Owner of Land. |
|---|---|---|
| Owner, | $917 | 10.2 |
| Part Owner, | 801 | 7.7 |
| Share Tenants, | 739 | 8.3 |
| Cash Tenants, | 938 | 3.0 |
| Labor-Share Tenants, | 726 | 9.5 |

The return to the landlord is highest when he furnishes all the capital to conduct his farm and allows the tenant a share, which is usually one-third, for his labor furnished. The second highest return to the landlord is obtained by share renting, the third highest return is obtained by the landlords who are renting to owners of farms, while the smallest return is obtained by the landlords who rent for cash. From the standpoint of the tenant, if he is an able farmer, he had better rent for cash, when possible. However, should he be a beginner or a man not well skilled in farming he had better share rent in order to have the advice, counsel and supervision of landlord to help him in his farming operations. The tenant should expect to pay a higher rental when he can depend upon the landlord for advice and capital. The labor-share tenants get still a smaller proportion, though the number of labor-share and cash tenants from which to draw conclusions is small. This is a logical return for both the tenant and landlord. The less capital and risk the tenant has, the less is his labor income and the greater the percentage returned to the landlord. The major portion of all these farms are share rented, a condition which indicates that the landlord recognizes the advantages of share renting. In addition, the landlord can maintain a more active interest in the farm, keep the buildings and fences in proper shape, direct to a limited extent the cropping and fertilization, and prevent deterioration of his tenant farm which so frequently occurs under tenant conditions. But due to the fact that most of these tenant farms are owned by the former occupants, they maintain a more active interest in the welfare of both the tenant and the farm. These facts are substantiated by the appearance of the region, for it is difficult to find a more prosperous looking area than this potato locality. Both tenant and owner farms are well equipped, provided with good buildings with the fields carefully tilled (see figs. 4 to 6).

Tenancy with these potato farms is an outcome of prosperity and does not indicate a backward step in the community, since both the landlord and the tenant are interested in their local conditions. Good roads, schools, churches and other community improvements are abundant, showing that this system of tenancy is an apparent success. If these farms were held for speculation, such improvements would not be so easily obtained.

Table VIII.—Number and Per Cent. of Landlords Receiving a Given Per Cent. on Their Investment on 154 Potato Farms.

| Per Cent. Received by Landlord. | Share Tenants. | | Labor-Share Tenants. | | Cash Tenants. | |
|---|---|---|---|---|---|---|
| | No. Farms. | Per Cent. | No. Farms. | Per Cent. | No. Farms. | Per Cent. |
| 2% or less, ......... | 3 | 2 | 1 | .. | 4 | 27 |
| 2.1 to 4, ......... | 7 | 5 | .. | .. | 7 | 45 |
| 4.1 to 6, ......... | 31 | 24 | 1 | .. | 2 | 14 |
| 6.1 to 8, ......... | 30 | 23 | 1 | .. | 1 | 7 |
| 8.1 to 10, ......... | 23 | 18 | 1 | .. | 1 | 7 |
| 10.1 to 12, ......... | 12 | 9 | 1 | .. | .. | .. |
| 12.1 to 14, ......... | 12 | 9 | 1 | .. | .. | .. |
| 14.1 to 16, ......... | 7 | 5 | 1 | .. | .. | .. |
| 16.1 + ............. | 7 | 5 | .. | .. | .. | .. |

One-third of all the landlords who share-rent their farms receive less than 6 per cent. on their money invested, two-fifths receive from 6 to 10 per cent., while the remainder, which is almost one-third, receive 10 per cent. or more for their capital invested. A few receive as much as 25 per cent., a very high return. There are not enough labor-share farms from which to draw conclusions; while the cash-rented farms, though few in number, show very consistently that there is no such wide difference in returns to the landlord.

It is quite evident from these results that the system of share renting is far too arbitrary. A potato farm situated four miles from the railroad should rent for less than one close to the railroad, because of the increased cost of hauling fertilizer and potatoes from the former. Again, a small farm cannot be as economically cultivated as a large one. This should be considered by a tenant when renting. Fields may be misshapen, hard to till or less fertile, all of which factors should be given more careful consideration in renting a farm. These things should be adjusted so that both the land and the tenant should receive their proper share from the farm. This would then give more just returns to both the tenant and the landlord. There are cases where the tenant receives more than he should. The cash tenant appears to have the better opportunity to obtain his just portion of the receipts. The range of returns to the landlord on the cash-rented farms is far more uniform than on the share-rented farms. It appears that greater care is exercised in renting a farm by cash than through share rent. The cash-rented farms are leased at their production values more frequently, so that factors such as fertility, soil, buildings and distance from the railroad are given more careful consideration. The most usual custom for share-rented farms is for the landlord to furnish the farm with one-half of the seed and one-half of the fertilizers, pay the farm taxes, and pay for building and fence repairs. In return the landlord gets one-half of all the receipts. The share is ordinarily the same regardless of the distance from the railroad, fertility of the farm, condition of buildings, and like conditions that affect the returns and cost of farm operations. The landlords as a class do not receive excesive returns, but some individuals do obtain more than their share. The cash landlords appear to be receiving less than they should, since money can be made to return over 3 per cent. if placed in a savings bank. When the landlord's returns are less than what could be obtained on a farm mortgage, they may be considered as being too low. These cash renters have unusually good bargains. However, the number is too few from which to draw far-reaching conclusions.

## RELATION OF TENURE TO SUCCESS

**Table IX.—Variation of Labor Income on 363 Potato Farms in Monmouth County, New Jersey.**

| | Owners. | | Tenants. | | Part Owners. | | Total. | |
|---|---|---|---|---|---|---|---|---|
| Labor Income. | No. of Farms. | Per Cent. | No. of Farms. | Per Cent. | No. of Farms. | Per Cent. | No. of Farms. | Per Cent. |
| Less than $1, | 39 | 21.0 | 12 | 8 | 5 | 25 | 56 | 15 |
| 1 to 400, | 33 | 16.0 | 39 | 27 | 3 | 15 | 75 | 21 |
| 401 to 700, | 26 | 13.0 | 33 | 22 | 2 | 10 | 61 | 16 |
| 701 to 1000, | 21 | 11.0 | 21 | 14 | 2 | 10 | 44 | 13 |
| 1001 to 1500, | 32 | 16.0 | 21 | 14 | 3 | 15 | 56 | 15 |
| 1501 to 2000, | 13 | 7.0 | 11 | 7 | 1 | 5 | 25 | 7 |
| 2001 to 2500, | 9 | 5.0 | 10 | 7 | 2 | 10 | 21 | 6 |
| 2501 and over, | 21 | 11.0 | 2 | 1 | 2 | 10 | 25 | 7 |

Out of 363 potato farms, which include all but 7 labor-share farms, 56 farms, or 15 per cent., have a minus labor income. The operators of some of these 56 farms are living on the interest of their capital, while a few have actually lost money, so that receipts are not above expenses. One-fifth receive between $1 and $400, while 131, or approximately one-third of the entire number, receive the same or less than the hired men of the community. Not quite one-third, or 105 farms, make between $400 and $1,000, while the remainder, or a little over one-third of the total number, make over $1,000. By comparing these returns with the wages a hired man receives, we find that one-third of the total number get no more than the hired men of the community, one-third get about twice what the hired men receive, while the remaining third get between 4 and 5 times what the hired men receive. When comparing the distribution of the tenants and owners in these classes, it is quite striking that a far larger proportion of the owners are losing money than the tenants. Of the total 194 owner farms, 39, or one-fifth, have a minus labor income, while of the tenant farms but 12, or 8 per cent., of the 149 have a minus labor income. Furthermore, the average of these losses for the owners is much greater than that of the tenants. One owner had a minus labor income of $2,057, while the tenants' greatest minus labor income was $606. The average of the minus labor incomes of the owners who lost money was $577, while that of the 12 tenants with minus labor incomes was but $216. This is to be expected since the owners have more capital invested, and therefore assume more risk. Poor management or improper organization can lose most where most capital is involved. The tenants lose less because they have less capital from which to lose. The owners, on the other hand, make the highest labor incomes as well as the greatest minus incomes. Of the 194 owners, 43, or more than one-fifth, make over $1,500, while of the tenants, 23, or a trifle above one-seventh, have a labor income of $1,500 or above. Two tenants make labor incomes above $2,500, while 21 owners have labor incomes above $2,500. Of these two tenants, one made $3,255 and the other $3,257. Both of these were on cash-rented farms. The highest labor income made by an owner was $10,343. Of the part owners one had a labor income of $5,731. It is quite evident that the owners have the best opportunity to make large labor incomes, as well as run the risk of losing the most money. The tenant's risk is not so great, nor is his opportunity of making a large return for his efforts so promising. The part owner stands midway between the two in respect to making a large labor income as well as risk of losing. The form of tenure does limit the possibilities of making, as well as losing, money. A good farmer, with sufficient capital, had far better be a farm owner.

## CAPITAL

Frequently capital is a limiting factor in farming operations. The average capital of the potato owner farms was $17,673, that for the part owners $16,675 and the share tenants $3,409. This includes land, stock, machinery and cash, everything used to carry on the farm business.

### RELATION OF CAPITAL TO TENURE AND LABOR INCOME

Table X.—Variation of Operators' Capital on 363 Potato Farms in Monmouth County, New Jersey.

| | Owners. | | Tenants. | | Part Owners. | |
|---|---|---|---|---|---|---|
| Operator's Capital. | No. of Farms. | Per Cent. | No. of Farms. | Per Cent. | No. of Farms. | Per Cent. |
| $1,000 or less, | .. | .... | 4 | 2.6 | .. | .. |
| 1,001 to 2,000, | .. | .... | 18 | 12.1 | 1 | 5 |
| 2,001 to 3,000, | .. | .... | 38 | 25.3 | .. | .. |
| 3,001 to 4,000, | 5 | 2.6 | 43 | 28.6 | .. | .. |
| 4,001 to 5,000, | 5 | 2.6 | 34 | 22.7 | .. | .. |
| 5,001 to 7,000, | 11 | 5.7 | 12 | 8.7 | .. | .. |
| 7,001 to 10,000, | 21 | 10.8 | .. | .... | 3 | 15 |
| 10,001 to 15,000, | 46 | 23.6 | .. | .... | 8 | 40 |
| 15,001 to 20,000, | 43 | 22.2 | .. | .... | 4 | 20 |
| 20,001 to 30,000, | 43 | 22.2 | .. | .... | 4 | 20 |
| 30,001 and over, | 20 | 10.3 | .. | .... | .. | .. |

The amount of capital required to do a successful business on these farms is high. The fact that so few of the owners have less than $10,000 would indicate its importance on these potato farms. These farms would be classed among the most highly capitalized of those in the State of New Jersey as well as in the Middle Atlantic States. So, too, is the tenants' capital high. When we consider that very little live stock is kept by the tenant except for labor and family use it would appear almost excessive, but such does not prove to be the case as will be shown later in Table XII.

Table XI.—Relation of Operators' Capital to Labor Income on 363 Potato Farms in Monmouth County, New Jersey.

| | Owners. | | Tenants. | | Part Owners. | |
|---|---|---|---|---|---|---|
| Capital Invested Per Farm. | No. of Farms. | Labor Income. | No. of Farms. | Labor Income. | No. of Farms. | Labor Income. |
| $1,000 or less, | .. | .... | 4 | $470 | .. | .... |
| 1,001 to 2,000, | .. | .... | 18 | 447 | 1 | $2,162 |
| 2,001 to 3,000, | .. | .... | 38 | 567 | .. | .... |
| 3,001 to 4,000, | 5 | $65 | 43 | 886 | .. | .... |
| 4,001 to 5,000, | 5 | 118 | 34 | 853 | .. | .... |
| 5,001 to 7,000, | 11 | 320 | 12 | 1,079 | .. | .... |
| 7,001 to 10,000, | 21 | 374 | .. | .... | 3 | 113 |
| 10,001 to 15,000, | 46 | 607 | .. | .... | 8 | 916 |
| 15,001 to 20,000, | 43 | 856 | .. | .... | 4 | 1,736 |
| 20,001 to 30,000, | 43 | 1,774 | .. | .... | 4 | 919 |
| 30,001 and over, | 20 | 1,250 | .. | .... | .. | .... |

On most of these potato farms the opportunity of making a satisfactory labor income with less than $10,000 would appear small. None of the tenants have an investment over $7,000, yet these tenants who have between $5,000 and $7,000 make an average of $1,079 labor income, while the owners with the same investment make a labor income of only $320, a difference of $759 in favor of the tenants. Over one-fifth of all the owners have too little capital upon which to do efficient business. Apparently, there is a tendency for some men to change from tenants to owners too quickly. They might better remain tenants until they are able to command a larger capital with which to do business. The tenants' capital is likewise important, and it would appear that a tenant should have about $2,500 before he starts as a share or cash tenant and still better $5,000 to $7,000. A young man starting out to earn a farm in this region had best start as a labor-share tenant, then change to cash or share tenant, and last to owner. Usually tenants can obtain some borrowed capital upon which to start, so that these conditions are not as severe on a young man just starting out to farm, as the figures would indicate. Again, many of these tenants are sons or relatives of the landlord, who is ready to furnish capital to such a tenant. A young man reputed for integrity and thrift, can usually obtain credit when the money is wanted for a worthy investment. If we compare the tenants' capital on these potato farms with that of the tenants in Chester County, Pennsylvania,[1] a region of dairy and general farming, or with that of the tenants in Iowa, Illinois and Indiana,[2] a region of live stock and general farming, we find the Monmouth County potato tenants' capital considerably higher. When we consider that these farms have a large investment of working capital, and that most of this working capital is in the form of work horses, machinery and cash to carry on the farm business, it would appear that they are quite efficiently equipped. That the landlords are the source of much of the capital needed by tenants is shown by the average capital of share and cash tenants. The share tenants have an average investment of $3,409, while the cash tenants have only $3,050. This is contrary to what is found in most areas, for usually the cash tenants require and have a greater amount of capital than the share tenants. In the potato region this may be influenced by several factors. First, the landlords of the cash tenants would not be as much inclined to finance their tenants. Second, the amounts of equipment, stock and machinery for cash and for share tenants are not very different. In many localities the share tenant owns only half of the cows and pigs, but here the tenants usually own all the stock and equipment, as in the case of the cash tenants. These are influencing factors which would have a tendency to equalize more nearly the tenants' investment on the cash and share-rented farms.

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[1] U. S. Dept. Agr. Bul. 341.
[2] U. S. Dept. Agr. Bul. 41.

**Table XII.—Relation of Tenants' and Landlords' Capital on 149 Potato Farms Operated by Tenants in Monmouth County, New Jersey, and the Tenants' Labor Income.**

| Tenants' Capital. | Tenants' Average per Farm. | Landlords' Average per Farm. | Landlords' and Tenants' Total per Farm. | No. of Farms. | Tenants' Average Labor Income. | Per Cent. Capital Furnished by Landlord. |
|---|---|---|---|---|---|---|
| $1,000 or less, .. | $785 | $5,925 | $6,710 | 4 | $470 | 86.8 |
| 1,001 to 2,000, .. | 1,624 | 9,498 | 11,122 | 18 | 447 | 85.3 |
| 2,001 to 3,000, .. | 2,583 | 14,353 | 16,936 | 38 | 567 | 84.7 |
| 3,001 to 4,000, .. | 3,416 | 20,901 | 24,317 | 43 | 886 | 85.9 |
| 4,001 to 5,000, .. | 4,442 | 21,250 | 25,692 | 34 | 853 | 82.7 |
| 5,001 to 7,000, .. | 5,764 | 23,828 | 29,593 | 12 | 1,121 | 80.5 |
| Average, .... | 3,340 | 17,767 | 21,107 | 149 | 753 | 84.2 |

The landlords' capital does not increase as uniformly with that of the tenants, as might be expected. It would appear that the capital of the tenants and that of the landlords do not always have the proper relation, as the relative amount of capital furnished by each varies. If the tenants' farms were grouped according to the landlords' capital rather than that of the tenants, a more uniform labor income increase could be obtained. A very noticeable break in the tenants' labor income is observed in the class of $4,442 compared with that of the $3,416 class. The tenants of the former class, with a $1,026 increase in capital, make $33 less labor income than those of the latter class. By comparing the capital furnished by the landlord on these two classes of farms, we find an increase in farm value of $349 only, of the former over the latter. From this it would appear that these tenants who have an investment of $4,442 do not farm a larger farm than those in the preceding class, or their increased operating capital is not met by a corresponding increase on the part of the landlords. This may account for the decrease rather than an increase in their labor income, above that of the $3,416 class. The next class with an average investment of $5,719 make an increase of $584 above the $4,442 men. But their corresponding landlords have an increase in capital of $1,514 or a total farm increase of $2,791. This then brings the tenant a marked return, for the landlord helps to furnish this increase in capital.

The average per cent. of capital furnished by the landlord is 84.2. The landlords on the lower capitalized farms furnish a somewhat greater proportion of the capital than those on the highly capitalized farms. However, the difference is not great. Probably the difference which does exist is due to the higher farm acre values of the lower capitalized farms. Comparing the average total capital used on the tenant farms with the total on the owner farms, we find it to be $3,434 greater on the tenant farms. In other words, the value of the real estate on the tenant farms is almost as great as the real estate and working capital of the owners. Thus the tenant farms have almost one-fifth more capital invested per farm than the owner farms.

**Table XIII.—Relation of Capital to a Given Labor Income on 194 Potato Farms Operated by Owners in Monmouth County, New Jersey.**

| | | Labor Income. | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Total Capital. | No. of Farms. | Less than $1. | $1 to $400. | $401 to $700. | $701 to $1,000. | $1,001 to $1,500. | $1,501 to $2,000. | $2,001 to $2,500. | $2,500 and Over. |
| $30,001 and over, .. | 20 | 3 | 3 | 2 | 2 | 3 | 2 | 1 | 4 |
| 20,001 to 30,000,.. | 43 | 6 | 4 | 4 | 2 | 9 | 1 | 4 | 13 |
| 15,001 to 20,000,.. | 43 | 7 | 3 | 8 | 6 | 11 | 3 | 3 | 2 |
| 10,001 to 15,000,.. | 46 | 9 | 14 | 5 | 4 | 4 | 7 | 1 | 2 |
| 7,001 to 10,000,.. | 21 | 3 | 7 | 4 | 5 | 2 | .. | .. | .. |
| 5,001 to 7,000,.. | 11 | 3 | 2 | 3 | 2 | 1 | .. | .. | .. |
| 4,001 to 5,000,.. | 5 | 2 | 2 | .. | 1 | .. | .. | .. | .. |
| 4,000 or less, ... | 5 | 3 | 1 | 1 | .. | .. | .. | .. | .. |

**Per Cent. of Potato Owner Farms Making a Given Income with a Specified Capital.**

| | | Labor Income. | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Total Capital. | No. of Farms. | Less than $1. | $1 to $400. | $401 to $700. | $701 to $1,000. | $1,001 to $1,500. | $1,501 to $2,000. | $2,001 to $2,500. | $2,500 and Over. |
| $30,001 and over, .. | 20 | 15.0 | 15.0 | 10.0 | 10.0 | 15.0 | 10.0 | 5.0 | 20.0 |
| 20,001 to 30,000,... | 43 | 13.9 | 9.8 | 9.3 | 4.6 | 20.0 | 2.3 | 9.8 | 30.3 |
| 15,001 to 20,000,... | 43 | 16.2 | 6.9 | 18.6 | 13.9 | 25.5 | 6.9 | 6.9 | 4.6 |
| 10,001 to 15,000,... | 46 | 19.5 | 31.7 | 10.6 | 8.6 | 8.6 | 15.2 | 2.1 | 4.1 |
| 7,001 to 10,000,... | 21 | 14.2 | 33.2 | 19.1 | 23.4 | 9.6 | .... | ... | ... |
| 5,001 to 7,000,... | 11 | 27.2 | 18.1 | 27.2 | 18.1 | 9.1 | .... | ... | ... |
| 4,001 to 5,000,... | 5 | 40.0 | 40.0 | .... | 20.0 | ... | .... | ... | ... |
| 4,000 or less,..... | 5 | 60.0 | 20.0 | 20.0 | .... | ... | .... | ... | ... |

This shows a marked relation between capital and the possibility of making a given labor income. Of the five farmers who had a capital of $3,000 to $4,000, one made a labor income as high as $551. Of the five who had $4,000 to $5,000, one made $762 by selling his crop in Asbury Park, while four made less than $400 labor income on these potato farms. Of the 21 farmers who had a capital of $7,000 to $10,000, two got a return of a little over $1,000 labor income, seven got over $700 labor income, while 11 got over $400 or more than the hired men receive. Thus these data indicate that an owner who has between $7,000 and

$10,000 capital has about one chance out of two in making more than $400 in this region and two chances out of twenty-one to make over $1,000. The group of farmers who have the largest number and proportion of their number making high labor incomes we find in the class of those with a capital between $20,000 and $30,000. Out of a total of 43 farms, 13 or almost one-third make a labor income over $2,500, while three out of five make over $1,000 labor income. This appears to be the most efficiently capitalized farm. A community of farms, all of which are as efficiently equipped as these, would certainly need no rural uplift movement. Such a locality would have good roads, schools, churches, libraries, and modern homes. There would be no farm labor problem, and the farmer's son and daughter would gladly stay on the farm. Such conditions are approaching the ideal, and only a few can hope to reach them. However, they serve as a guide toward development of the farm and the amount of capital that is most profitable to invest. Just how this capital should be invested, whether in land, buildings or stock, will be shown later. A farm owner should have at least $10,000 to invest, and should he be just starting, he had far better borrow $10,000 more and invest $20,000. From these results a $10,000 mortgage would be far easier to pay off on a $20,000 farm than a $5,000 mortgage on a $10,000 farm. To anyone who is considering the purchase of a farm this is of much importance. Above $30,000 capital, the average labor income as well as the opportunity of making a high labor income decreases. These twenty farms it is quite evident are too highly capitalized. While these farms are conducted for profit, the same as those in the class of $20,000 to $30,000 capital, they are equipped with costly dwellings, barns and improvements which bring no return. However, they are not owned by so-called gentlemen farmers, but by men who raise productive crops. It is merely the investment in improvements that brings no farm income, such as a $7,000 house and others of like nature.

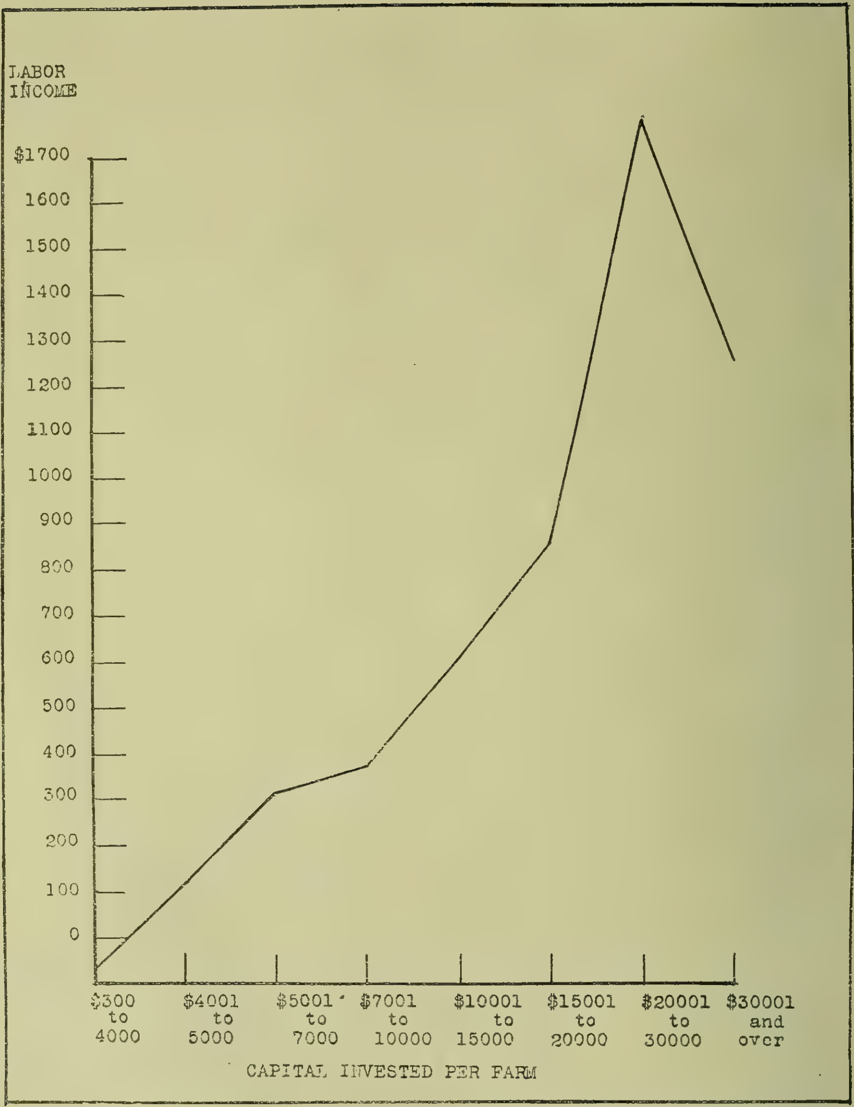

Fig. 19.—Relation of Capital to Labor Income on 194 Farms Operated by Owners in Monmouth County, New Jersey.

### Table XIV.—Relation of Capital to a Given Labor Income on 149 Potato Farms Operated by Tenants in Monmouth County, New Jersey.

| Tenants' Capital. | No. of Farms. | Less than $1. | $1 to $400. | $401 to $700. | $701 to $1,000. | $1,001 to $1,500. | $1,501 to $2,000. | $2,001 to $2,500. | 2,501 ~~$2,500~~ and Over. |
|---|---|---|---|---|---|---|---|---|---|
| $1,000 or less, .... | 4 | .. | 2 | 1 | 1 | .. | .. | .. | .. |
| 1,001 to 2,000, .. | 18 | 2 | 6 | 4 | 4 | 1 | 1 | .. | .. |
| 2,001 to 3,000, .. | 38 | 2 | 11 | 15 | 3 | 4 | 3 | .. | .. |
| 3,001 to 4,000, .. | 43 | 4 | 11 | 5 | 5 | 8 | 4 | 6 | .. |
| 4,001 to 5,000, .. | 34 | 3 | 6 | 7 | 6 | 7 | 2 | 2 | 1 |
| 5,001 to 7,000, .. | 12 | 1 | 3 | 1 | 2 | 1 | 1 | 2 | 1 |

### Per Cent. of Tenant Potato Farms Making a Given Income with a Specified Capital.

| Tenants' Capital. | No. of Farms. | Less than $1. | $1 to $400. | $401 to $700. | $701 to $1,000. | $1,001 to $1,500. | $1,501 to $2,000. | $2,001 to $2,500. | 2,501 ~~$2,500~~ and Over. |
|---|---|---|---|---|---|---|---|---|---|
| $1,000 or less, .... | 4 | .... | 50.0 | 25.0 | 25.0 | .... | .... | .... | ... |
| 1,001 to 2,000, .... | 18 | 11.1 | 33.3 | 22.2 | 22.2 | 5.5 | 5.5 | .... | ... |
| 2,001 to 3,000, .... | 38 | 5.2 | 28.9 | 39.4 | 7.8 | 10.5 | 7.8 | .... | ... |
| 3,001 to 4,000, .... | 43 | 9.3 | 25.5 | 11.5 | 11.5 | 18.6 | 9.3 | 13.9 | ... |
| 4,001 to 5,000, .... | 34 | 8.8 | 17.6 | 20.6 | 17.6 | 20.6 | 5.8 | 5.8 | 2.9 |
| 5,001 to 7,000, .... | 12 | 8.3 | 25.0 | 8.5 | 16.6 | 8.3 | 8.4 | 16.6 | 8.4 |

This shows the same relation for distribution of labor incomes to a given amount of capital as in the case of the owners. As long as the tenant does not have sufficient capital to operate a fair-sized business, he had better rent as a labor-share tenant where the landlord furnishes all the capital, or work as a hired man. From these data it appears that the tenant should not have less than $2,000 before he can hope to do much better than the hired man. Five to seven thousand dollars is far more desirable, and would appear to give a tenant a good opportunity of making a good labor income for his year's work. While this is a large amount of capital for a tenant to invest, the returns fully warrant the investment. If the tenant is of good character and a good farmer he usually can get considerable capital from the landlord to finance his business. When the tenants as a class make an average of $753 labor income, they have prosperous conditions and an opportunity to save money with which to purchase a farm later. The twelve tenants who have a capital between $5,000 and $7,000 made an average labor income of $1,079, while five of the twelve made over $1,000. Over one-third of those who had a capital between $4,000 and $5,000 made a labor income of $1,000 or more. Thus a tenant farmer should have not less than $2,000 capital, and much better $5,000 to $7,000 capital invested in his business. This class would compare favorably with the owner who has between $20,000 and $30,000 invested.

**Table XV.—Return for Each $1,000 Capital Invested on 194 Potato Farms Operated by Owners in Monmouth County, New Jersey.**

| Capital. | No. of Farms. | Return per $1,000 Investment. | Labor Income per $1,000 Investment. | Per Cent. Returned on Investment. |
|---|---|---|---|---|
| $3,000 to $4,000, | 5 | $33 | Loss.<br>$17 | 3.3 |
| | | | Gain. | |
| 4,001 to 5,000, | 5 | 76 | 26 | 7.6 |
| 5,001 to 7,000, | 11 | 103 | 53 | 10.3 |
| 7,001 to 10,000, | 21 | 94 | 44 | 9.4 |
| 10,001 to 15,000, | 46 | 98 | 48 | 9.8 |
| 15.001 to 20,000, | 43 | 99 | 49 | 9.9 |
| 20,001 to 30,000, | 43 | 121 | 71 | 12.1 |
| 30,001 and over, | 20 | 85 | 35 | 8.5 |

The labor income for the owners who have a capital between $20,000 and $30,000 is not only greater for these farms, but is likewise greater per $1,000 invested in the farm. When we can find a capital that returns a greater net profit to the farmer and at the same time gives a greater return per $1,000 invested, it is illustrated very clearly that this amount of capital will provide for the most efficient farm unit. A farm income of $121 per year for each $1,000 invested in a business is a very satisfactory investment. If we deduct $50 for interest at 5 per cent. we have left $71 per $1,000 which represents the labor income per $1,000 for the operator's efforts and management. When farms as a class make an average return such as these $20,000 to $30,000 farms, certainly a very efficient and highly desirable business is provided for. We must conclude from this that $20,000 to $30,000 will provide for the most efficient potato farm in this region, and give the greatest opportunity for the farmer to make a large labor income.

## DISTRIBUTION OF CAPITAL ON THE FARM.

**Table XVI.—Distribution of Capital on 194 Potato Farms Operated by Owners in Monmouth County, New Jersey.**

| Form of Investment. | Investment in 194 Farms. | Investment per Farm. | Per Cent. of Total Investment per Farm. |
|---|---|---|---|
| Real Estate, | $2,744,210 | $14,145 | 80.0 |
| Live Stock, | 270,455 | 1,394 | 7.9 |
| Machinery and Tools, | 164,320 | 847 | 4.8 |
| Feed, | 75,686 | 390 | 2.2 |
| Cash, | 174,195 | 897 | 5.1 |
| Total, | $3,428,866 | $17,673 | 100.00 |

The proportion of investment in land is not exceptionally high in this region if we compare it with that of other regions in the United States where similar surveys have been made. However, the proportion invested in real estate is somewhat higher than that found in Chester County, Pennsylvania,[1] and that in Tompkins County, New York,[2] but not as high as Indiana, Iowa and Illinois.[3] When we consider that these potato farms possess very little live stock, except work horses and a few cows, pigs and chickens, much of which is largely for family use, we must admit that the proportion of investment in stock is high. This investment in live stock is largely in work horses, since each farm has an average of about 5½ work horses, with an average value of $175 per horse, or almost $1,000 invested for work horses per farm. The work animals represent 5.2 per cent. of the total farm investment, allowing only 2.7 per cent. for productive live stock, as cows, chickens, etc. An average farm value of $175 for farm work horses indicates a good grade of work stock. Potato farming requires a large amount of hauling, while heavy draught implements, such as the potato diggers, are used in the field. This calls for horses of a high grade, that can be efficiently used for hauling on the road and heavy operations in the field. In their field operations these potato farmers plow and cultivate deeply, another process which requires good work animals.

The investment of $847 for machinery per farm is highest for any region yet surveyed, but the proportion of investment in machinery is not as high as that in many other localities. It may appear high, especially when we are considering a specialized farm, which should not require such an extensive number of different machines and implements. Much of this high investment is found in potato diggers, planters, sprayers and wagons for hauling the crop. Thus the equipment necessary to care for the potato crop, when we include all the tillage implements with the other articles mentioned, is large. In addition to this each farmer usually raises hay, corn and small grain, so that he has nearly all the required machinery for general farming, and has, in addition, the machinery needed for the potato crop. This type of farming demands efficient equipment. The large potato diggers are not only heavy of draught, but require much repair if not in good condition. Poor equipment may cause a fatal delay in harvesting the potato crop. Thus the large amount of equipment necessary to handle the potato crop makes a large investment in machinery necessary. The amount of cash necessary to operate these farms successfully is large, as one would expect. In the spring a large outlay must be made in potato seed, fertilizer, and labor for the season. The return on these investments is not obtained until the crop is harvested; so the farmer has the major portion of his income for his year's work in the season when potatoes are harvested. The rest of the year he must finance his operation from money made on the previous potato crop or on borrowed capital.

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[1] U. S. Dept. Agr. Bul. No. 341.

[2] U. S. Dept. Agr. Bul. No. 41.

[3] N. Y. Agr. Exp. Sta. Cornell Bul. No. 295.

Table XVII.—Distribution of Tenants' Capital on Potato Farms Operated by Tenants in Monmouth County, New Jersey.

| | 132 Share Tenants. | | 15 Cash Tenants. | |
|---|---|---|---|---|
| Form of Investment. | Investment Per Farm. | Per Cent. | Investment Per Farm. | Per Cent. |
| Real Estate, | ...... | .... | ...... | .... |
| Stock, | $1,548 | 46.0 | $1,449 | 50.0 |
| Machinery and Tools, | 799 | 23.7 | 698 | 20.0 |
| Feed and Supplies, | 337 | 10.0 | 325 | 10.0 |
| Cash, | 685 | 20.3 | 613 | 20.0 |
| Total, | $3,369 | 100.0 | $3,085 | 100.0 |

Both share and cash tenants have a greater investment in live stock than the owners, but they have a smaller investment in machinery, tools, feed, supplies and cash. Inasmuch as the landlord must pay for one-half of the fertilizer and potato seed, we would not expect the tenant to have as much cash on hand. Further, he appears to invest less in implements and machinery. It is quite likely that the tenant has a smaller investment in machinery, since the tenants as a class have not been farming as long as the owners, and consequently they have not accumulated so large an amount. It is not uncommon to find a farm equipped with more machinery than is sometimes economical.

The average investment per farm, when the landlord's capital is included with that of the tenants, is $21,107. For the owner farms the total farm capital is but $17,673. This gives the tenant farms an increased capital of 19.5 per cent., or almost one-fifth above the owner farms. The tenant farms are thus more heavily capitalized, but the average is within the most efficiently capitalized class of owner farms, where between $20,000 and $30,000 capital is invested. It is also significant that the tenant farms, though having a greater average capital than the owners, have not reached the point of over-capitalization. The twelve highest capitalized tenant farms having an average capital of $29,593 are the most profitable. The tenant farms, as a class, are more efficient than those of the owners. But it is essential that they be so, otherwise they would be unable to support two families, or allow the landlord who previously operated the farm, to accumulate sufficient so that he could move to town.

## INCREASE IN FARM LAND AND BUILDING VALUES

Before finishing the comparison of owner and tenant farms, mention should be made of the increase in land values which is not shown in the labor income of the owner farms or in the per cent. received by the landlord on his investment.

Table XVIII.—Increase of Land Values as Shown by the United States Census for 1910.

| Locality. | Value Per Acre 1900. | Value Per Acre 1910. | Increase Amount. | Increase Per Cent. |
|---|---|---|---|---|
| United States, | $19.81 | $39.60 | $19.79 | 100.0 |
| New Jersey, | 57.23 | 84.36 | 27.13 | 47.5 |
| Monmouth County, | 73.93 | 122.53 | 49.40 | 65.0 |

This is a factor which is not to be overlooked. Farm values in the State are increasing rapidly so that the landlords realize a fair per cent. on their investment if they get no cash return from their farms. While this is not true in every individual case, for the State as a whole it is applicable.

## RELATION OF CAPITAL TO RETURN ON THE INVESTMENT

Table XIX.—Return for Each $1,000 Capital Invested on 194 Potato Farms in Monmouth County, New Jersey, Operated by Owners, When Increases of Land Values are Included.

| Capital. | No. of Farms. | Cash Return Per Cent. | Increase in Farm Value for County 1900 to 1910. | Total Returns or Per Cent. on Investment. |
|---|---|---|---|---|
| $3,000 to $4,000, | 5 | 3.3 | 6.5 | 9.8 |
| 4,001 to 5,000, | 5 | 7.6 | 6.5 | 14.1 |
| 5,001 to 7,000, | 11 | 10.3 | 6.5 | 16.8 |
| 7,001 to 10,000, | 21 | 9.4 | 6.5 | 15.9 |
| 10,001 to 15,000, | 46 | 9.8 | 6.5 | 16.3 |
| 15,001 to 20,000, | 43 | 9.9 | 6.5 | 16.4 |
| 20,001 to 30,000, | 43 | 12.1 | 6.5 | 18.6 |
| 30,001 and over, | 20 | 8.5 | 6.5 | 15.0 |

This makes a very high return to the owners, but the correct amount of increase for the individual farm is very difficult to obtain, and such data can be handled only collectively. This would make an average return to the owners of 16.17 per cent. if we estimate their increase of farm acre value to be the same as that in Monmouth County between 1900–1910. Since 1910 the rate of increase has, apparently, not been lowered; so 6.5 per cent. a year would not be too high.

Table XX.—Return to the Landlord on Farms Occupied by Tenant When Increase of Land Values is Added to the Cash Return.

| Tenure. | Tenants' Labor Income. | Per Cent. Cash Return to Landlord on Investment. | Per Cent. Increase of Land Values. 1900 to 1910. | Per Cent. Total Return for Landlord. |
|---|---|---|---|---|
| Share Tenant, | $739 | 8.3 | 6.5 | 14.8 |
| Cash Tenant, | 938 | 3.0 | 6.5 | 8.5 |
| Labor-Share Tenant, | 726 | 9.5 | 6.5 | 16.0 |

The landlord and owner alone share in the increase of land values. This is a factor which the tenant must recognize. As soon as possible it is well for a tenant to purchase in a region where land values are increasing in order to get the benefit of this increase. It, too, makes a far more attractive investment for the landlord. Even though these landlords get no cash return from their tenant farms, they get over 6 per cent. for their investment on increase of land values alone. Such conditions cannot continue indefinitely and therefore should not be considered as a positive return for an indefinite period. However, present indications do show a very prosperous condition in this community. Evidently, the farmer is at last getting his share of prosperity. Localities such as this, where tenants make an average labor income of $753, and owners $917, where landlords get 7.8 per cent. cash return on their money invested, and where land values are increasing at the rate of 6½ per cent. a year, are not frequently encountered in the United States.

## SIZE OF BUSINESS

The average-sized farm in New Jersey is 76.9 acres, that of Monmouth County 70.3 acres, while the average size of the potato-owners' farms, included in this survey, is 98.3 acres, of which 73 acres are actually in crops. The tenant farms have a total of 123.6 acres per farm, of which 86.7 are crop acres. The 370 potato farms, taken as a group, have an average of 109.4 total acreage per farm, of which 79.2 were in actual crops.

### RELATION OF SIZE TO LABOR INCOME

Since the major portion of receipts from these farms is derived directly from the crops grown, the number of acres in the farm is a good measure of the size of a farmer's business. Practically all farms have a certain part of the area which is either permanently or temporarily not cropped. Therefore, a more true measure is the crop acreage rather than the farm acreage. A man may have a farm area of 150 acres but crop only 100, while his neighbor may have 110 acres and crop 100. Some farms have a large proportion in waste, such as roads, banks, cuts and fences. Though the amount is fairly uniform in some localities, it was found to vary considerably on these potato farms, due probably to the great variation in soil types. Throughout this publication, the size of farm is, therefore, measured in terms of crop acres. For any who are considering the purchase of a farm in such a locality, the number of crop acres is more important than the total farm area. In a dairy or live stock region, this would not necessarily be true. Again, in a region of live stock and grain farming, the size or amount of the farm business depends also upon the amount of live stock kept.

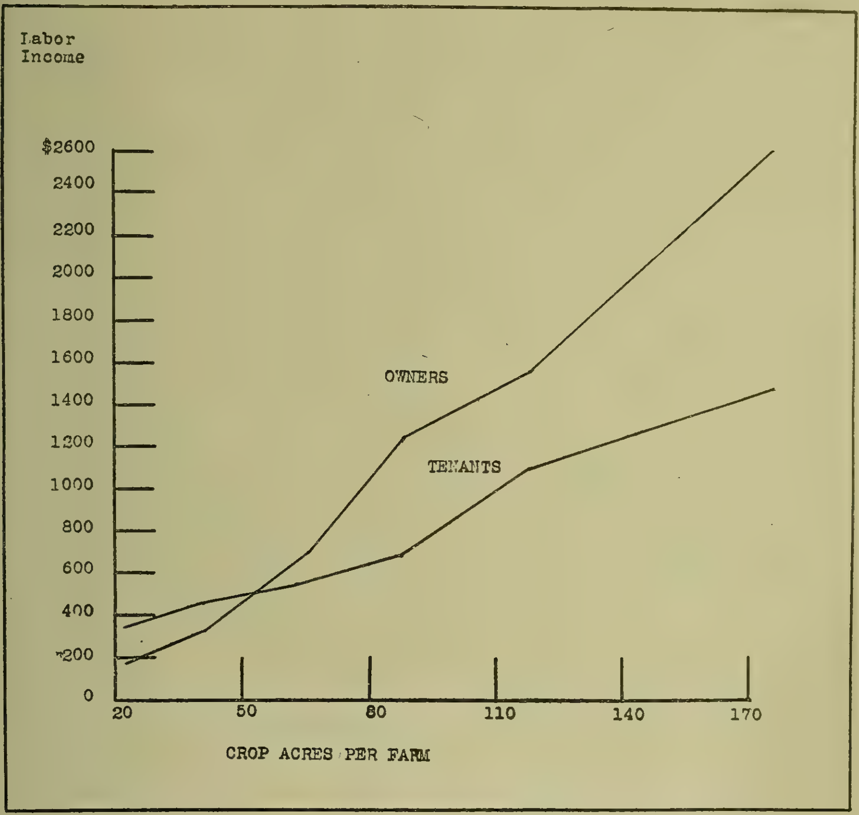

Fig. 20.—Relation of Labor Income to Number of Crop Acres per Farm on 343 Potato Farms in Monmouth County, New Jersey.

Table XXI.—Relation of Size of Farm to Labor Income on 194 Potato Farms Operated by Owners in Monmouth County, New Jersey.

| Crop Acres. | No. of Farms. | Per Cent. of Total Number | Average Number of Crop Acres. | Labor Income. |
|---|---|---|---|---|
| 30 or less, | 20 | 10 | 22.6 | $163 |
| 31 to 50, | 35 | 18 | 41.5 | 329 |
| 51 to 75, | 54 | 28 | 64.7 | 702 |
| 76 to 100, | 52 | 27 | 86.8 | 1,239 |
| 101 to 150, | 27 | 14 | 118.4 | 1,567 |
| 151 and over, | 6 | 3 | 176.0 | 2,611 |

The average return per farm, or labor income, increases uniformily with the increase in number of crop acres. It is quite apparent that a farm of less than 50 crop acres is too small for a satisfactory business on these farms. Out of the total number of 194 owners' farms, 55, or over one-fourth, have too small an area to allow a profitable business. An owner's farm of less than 30 acres is entirely too small. Men on these farms had better work as hired men or as tenants on a larger farm. On farms having between 76 to 100 crop acres, a very satisfactory return is obtained, while on farms having over 151 crop acres, with an average of 176 per farm, the highest return of all the groups is obtained.

The average size of these owners' farms is 73 crop acres, or 98.3 farm acres. This is a large area, if compared with that of other regions, when we consider that potato growing is an intensive type of farming which requires much labor per acre. These farmers are thus afforded an opportunity to make a good labor income. To a large extent, this is a very important factor in the success of these farms. In other words, they afford these farmers a larger business than is furnished for the average farmer in the Middle Atlantic States. When these farms were first settled, general farming, including stock raising, was the common practice. But as the potato industry developed, general farming and stock raising were replaced by potato growing. The potato crop requires more labor and returns greater receipts per acre. The farmers increased their business by adopting a more intensive type of farming. This is a very good illustration of a farm community increasing the amount of farm business, through a more intensive as well as a more profitable type of farming, by increasing the potato acreage. Taken as a class, not only are these farms sufficiently large to make a living for the operator, but he is able to save some money after he has provided for his family.

**Table XXII.—Relation of Size of Farm to Labor Income on 149 Potato Farms Operated by Tenants in Monmouth County, New Jersey.**

| Crop Acres. | No. of Farms. | Per Cent. of Total Number. | Average Crop Acres. | Labor Income. | Owners' Labor Income on Same Sized Farms. |
|---|---|---|---|---|---|
| 30 or less, ............. | 4 | 2.7 | 21.8 | $346 | $163 |
| 31 to 50, ............... | 12 | 8.1 | 41.1 | 462 | 329 |
| 51 to 75, ............... | 33 | 22.1 | 63.9 | 555 | 702 |
| 76 to 100, ............. | 62 | 41.7 | 87.9 | 698 | 1,239 |
| 101 to 150, ............. | 33 | 22.1 | 118.1 | 1,099 | 1,567 |
| 151 and over, ........... | 5 | 3.3 | 176.6 | 1,478 | 2,611 |

The same relation is shown between size of farm and labor income on the tenant farms as on the owner farms. However, the extremes are not as great as on the latter. The tenants on small farms make more, while on large farms they make less, than owners on areas of the same size. One reason for the difference between the labor income of tenants and that of owners on the small farms is that a few retired owners live on small areas which they farm, but are not entirely dependent on them for their living. Again, tenants on small farms do more work off the place in order to be more fully occupied. Moreover, there are not nearly as large a proportion of the tenants who rent small farms as owners who live on small farms. A larger percentage of the tenants rent large farms. This fact is another argument that the tenant realizes the value of getting a good-sized acreage in order to obtain a good-sized business.

**Table XXIII.—Relation of Size of Farm to Distribution of Labor Incomes on 194 Potato Farms Operated by Owners in Monmouth County, New Jersey.**

| | | Labor Income. | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Crop Acres. | No. of Farms. | Less than $1. | $1 to $400. | $401 to $700. | $701 to $1,000. | $1,001 to $1,500. | $1,501 to $2,000. | $2,001 to $2,500. | $2,501 and Over. |
| 30 or less, ....... | 20 | 8 | 4 | 4 | 3 | 1 | .. | .. | .. |
| 31 to 50, ........ | 35 | 10 | 10 | 5 | 4 | 2 | 2 | 1 | 1 |
| 51 to 75, ........ | 54 | 9 | 13 | 8 | 6 | 7 | 7 | 1 | 3 |
| 76 to 100, ....... | 52 | 8 | 3 | 5 | 5 | 15 | 3 | 5 | 8 |
| 101 to 150, ....... | 27 | 4 | 2 | 3 | 3 | 5 | 2 | 2 | 6 |
| 151 and over, ..... | 6 | 0 | 1 | 1 | .. | 1 | .. | .. | 3 |

The opportunities for making a good labor income are quite limited on a small crop area. One man who had 30 crop acres, and a labor income between $1,000 and $1,500, retailed his potatoes, receiving $2.25 to $3.00 per barrel for his whole crop. The three men who had less than thirty acres and made between $700 to $1,000 likewise retailed their crop and got a high price so as to give them a high return per acre and at the same time give them a larger business. However, 8, or two-fifths, of these men who had 30 acres or less lost money. It is quite noticeable that the proportion of men losing money decreases rapidly with the increase on the size of the farms. This itself argues well for the larger farms. The most desirable size appears to be 100 or more crop acres. However, a large size does not guarantee a large labor income. But it does provide one very important factor usually necessary for making a good labor income. Of the six men who had an average of 176.6 crop acres, 3, or one-half, made labor incomes of over $2,500. Of the 27 who had an average of 118 acres per farm, 15, or over one-half, made labor incomes of $1,000 or more, while 8, or almost one-third, made over $2,000. In this same group 4 men lost money. Thus we see that while large size does not guarantee large returns, it makes the possibilities far greater for obtaining them.

Table XXIV.—Relation of Size of Farms to Distribution of Labor Incomes on 149 Potato Farms Operated by Tenants in Monmouth County, New Jersey.

| | Labor Income. | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Crop Acres. | No. of Farms. | Less than $1. | $1 to $400. | $401 to $700. | $701 to $1,000. | $1,001 to $1,500. | $1,501 to $2,000. | $2,001 to $2,500. | $2,501 and Over. |
| 30 or less, ...... | 4 | .. | 3 | 1 | .. | .. | .. | .. | .. |
| 31 to 50, ........ | 12 | .. | 7 | 2 | 1 | 1 | 1 | .. | .. |
| 51 to 75, ........ | 33 | 4 | 9 | 9 | 5 | 5 | 1 | .. | .. |
| 76 to 100, ....... | 62 | 5 | 18 | 15 | 6 | 9 | 4 | 5 | .. |
| 101 to 150, ...... | 33 | 3 | 4 | 6 | 6 | 4 | 4 | 4 | 2 |
| 151 and over, .... | 5 | .. | .. | .. | 1 | 2 | 1 | 1 | .. |

In distribution, the tenant incomes are more bunched than are those of the owners. There is a smaller proportion losing money as well as making large incomes. Moreover, the number making large labor incomes increases as the area per farm increases. The tenants who farm an average of 118.1 crop acres have 14, or almost one-half, making labor incomes over $1,000. Those with 176.6 crop acres have 4 out of 5 making labor incomes of over $1,000, while those with 30 acres or less have none making over $700. Tenants with 63.9 crop acres have 6 out of 33, or one-fifth, while those with 87.9 crop acres have 18 out of 62, or about one-third, who make $1,000 or more. Farming differs from manufacturing industries in that much space is required in order to carry on a satisfactory business. Though the size of business can be increased by adopting a more intensive type of farming or by increasing production, yet there is a narrow limit to which this is applicable. These farmers, as a class, have increased their farm business by increasing the potato acreage and by increasing their potato production. Still there are a considerable number who have too small areas for carrying on a profitable business.

## RELATION OF SIZE OF FARM TO EFFICIENCY IN FARM OPERATIONS.

The fact that large farms are more profitable than smaller ones, is not due entirely to the magnitude or amount of business, but there are other factors which enter into the operation of the large farm that make it more profitable. The larger potato grower does not only grow more potatoes from which he makes a profit, but he very frequently grows them at less cost per bushel than the small grower. There are a number of reasons why this is true, one or all of which have a direct bearing upon more economical production on the large farm.

**Table XXV.—Relation of Number of Crop Acres to Labor Efficiency of Men, Horses, and Machinery on 194 Potato Farms Operated by Owners in Monmouth County, New Jersey.**

| Crop Acres. | No. of Farms. | Crop Acres per Man. | Crop Acres per Horse. | Crop Acres per $100 Worth of Machinery. | Work Units per Man. | Work Units per Horse. | Crop Acres per Farm. |
|---|---|---|---|---|---|---|---|
| 30 or less, .. | 20 | 17.8 | 9.1 | 6.7 | 161.1 | 65.4 | 22.6 |
| 31 to 50, .... | 35 | 19.8 | 10.7 | 6.5 | 175.5 | 73.4 | 41.5 |
| 51 to 75, .... | 54 | 25.4 | 12.9 | 8.0 | 218.6 | 86.0 | 64.7 |
| 76 to 100, ... | 52 | 27.7 | 14.7 | 8.5 | 221.7 | 87.8 | 86.8 |
| 101 to 150, .. | 27 | 32.6 | 16.3 | 11.1 | 227.6 | 94.8 | 118.4 |
| 151 and over, . | 6 | 42.2 | 17.2 | 12.0 | 292.7 | 102.0 | 176.0 |

As the size of the farm increases, more productive work is accomplished by man, horse and machinery labor. On the larger farms one man cares for 2.4 crop acres to 1 acre on the smaller farms. This means that the larger farms raise their crops at a smaller acre cost or bushel cost than do the small farms. The number of crop acres per horse on the small farms is 9.1, while on the largest farms it is one horse for 17.2 crop acres. On the large farms a horse will cultivate and care for almost twice as many crop acres as on the small farms.

The machinery likewise is used more economically on the large farms, since $100 worth of machinery will care for 12 crop acres while on the small farms it cares for 6.7 crop acres only. By measuring this efficiency in the use of man, horse and machinery labor in terms of man work units, which is a better and more true measure, we find that a man actually accomplishes or raises 1.81 times, or about twice, as many acres of potatoes and other crops than does a man on a small farm. If a man on a large farm can produce 181 bushels of potatoes for every 100 bushels he could produce on the small farm by working the same number of days, it is quite evident that the large farms are far more economical in the use of man labor. The large farms afford more steady and uniform work for their men employed, and at the same time men can accomplish more for the time spent at work.

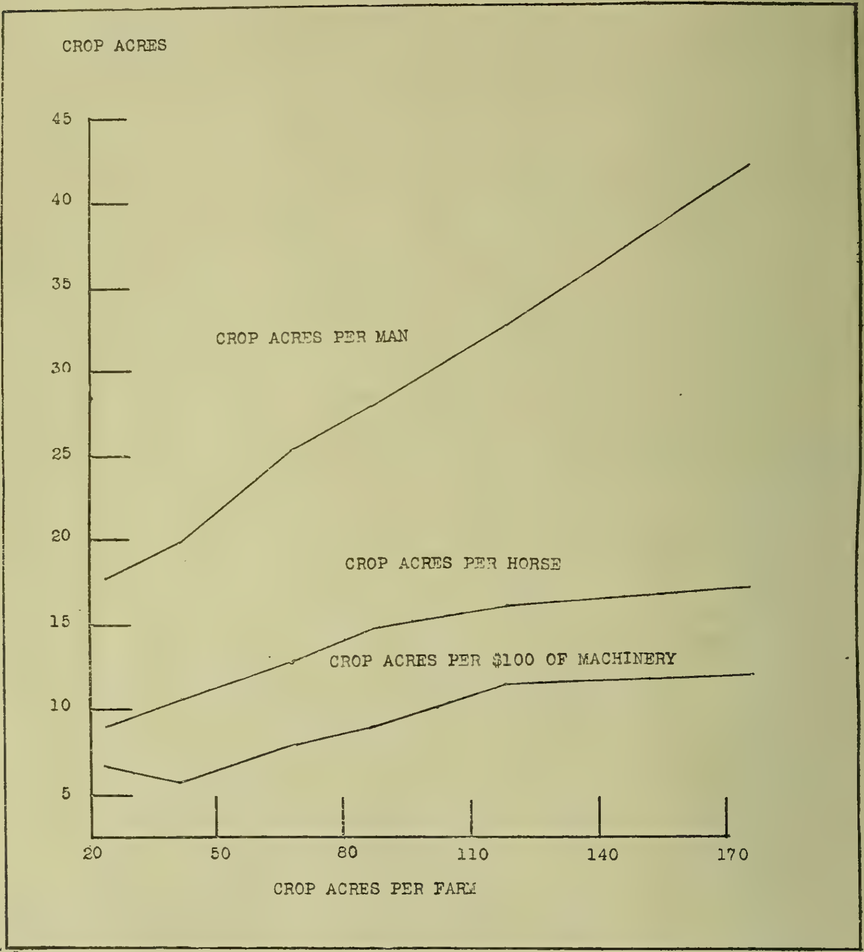

Fig. 21.—Relation of Number of Crop Acres to Labor Efficiency of Men, Horses and Machinery on 194 Farms Operated by Owners in Monmouth County, New Jersey.

When measuring the efficiency of horses by work units per horse we find the same relation as for man labor though the difference is not quite so great. For each acre of potatoes or other crops produced by a horse on the small farm, 1.56 or 1½ times as many acres, are produced on the larger farms.

**Table XXVI.—Relation of Crop Acres to Labor Efficiency of Man, Horse and Machinery Labor on 149 Potato Farms Operated by Tenants in Monmouth County, New Jersey.**

| Crop Acres. | No. of Farms. | Crop Acres per Man. | Crop Acres per Horse. | Crop Acres per $100 Worth of Machinery. | Work Units per Man. | Work Units per Horse. |
|---|---|---|---|---|---|---|
| 30 or less, .............. | 4 | 15.6 | 8.7 | 5.7 | 152.8 | 62.3 |
| 31 to 50, ................ | 12 | 23.5 | 12.3 | 8.8 | 190.4 | 78.3 |
| 51 to 75, ................ | 33 | 29.5 | 12.4 | 9.4 | 241.7 | 78.6 |
| 76 to 100, ............... | 62 | 31.0 | 15.7 | 10.4 | 226.8 | 90.2 |
| 101 to 150, .............. | 33 | 33.5 | 16.5 | 11.7 | 248.7 | 93.5 |
| 151 and over, ............ | 5 | 47.7 | 20.8 | 19.5 | 302.4 | 113.0 |

The same relation is shown for the tenants as for the owners. Moreover the extremes are somewhat greater for the tenant than for the owner farms. If the two extreme classes are eliminated the difference between the tenant and the owner farms is not great. Therefore, we may conclude that the tenant's labor efficiency is affected by *size* to as great a degree as that of the owner. As a class the tenants are somewhat more efficient in the employment of man, horse and machinery labor, due in part to the fact that their farms are to a certain extent larger. However, tenant farms are somewhat more efficient than the owner farms. They usually have a few more crop acres per man, horse and machine labor. This is again shown when man work units are used as a measure of work actually done. Monmouth County tenants have actually raised more acres of potatoes and other crops per man than the owners. This is not surprising since the tenant must exert himself more in order to get a return sufficient for his living than does the owner. When we consider, therefore, that on the larger farms there is accomplished from 1½ to 2 times as much work per man, horse and $100 worth of machinery employed, it is quite evident large farms should be making more profitable returns to their owners than small farms.

## RELATION OF SIZE OF FARM TO BUILDINGS

Whether large or small, a farm needs a dwelling for the family to live in, and barns and sheds for farm operations. The small farms should have a dwelling almost as large and as well equipped as the large farm. Barns and other farm buildings vary in size to accommodate the need of the individual farm. However, a barn equally well equipped can be built so that the cost per horse will be less when it is made to accommodate 8 horses than if built for 4 horses. More acres are farmed per horse on the large farms, so that the proportionate acre expense for maintaining buildings for horses is less on the large farm than on the small farm. Money spent for buildings brings no cash return and therefore it should be carefully invested.

Table XXVII.—Relation of Size of Farm to Buildings and Building Investment on 194 Potato Farms Operated by Owners in Monmouth County, New Jersey.

| Crop Acres. | No. of Farms. | Average Value of All Buildings. | Per Cent. of Total Real Estate Capital. | Value of Dwelling. | Per Cent. of Total Farm Real Estate Capital. | Value of Barn. | Per Cent. of Total Real Estate Capital. |
|---|---|---|---|---|---|---|---|
| 30 or less, ...... | 20 | $2,500 | 49.8 | $1,655 | 33.0 | $845 | 16.8 |
| 31 to 50, ....... | 35 | 3,766 | 43.4 | 2,229 | 25.7 | 1,537 | 17.7 |
| 51 to 75, ....... | 54 | 4,974 | 44.8 | 3,063 | 22.6 | 1,911 | 22.2 |
| 76 to 100, ...... | 52 | 5,613 | 34.4 | 3,128 | 18.9 | 2,485 | 15.5 |
| 101 to 150, ...... | 27 | 6,811 | 29.1 | 2,833 | 12.1 | 3,978 | 17.0 |
| 151 and over, .... | 6 | 6,617 | 30.1 | 4,367 | 20.3 | 2,250 | 9.8 |

Of the total capital on the farm, that which is invested in buildings amounts on the average to 35.2 per cent. of the total farm investment. According to the 1910 census the building investment for Monmouth County is 35.2 per cent. of the total real estate value. For the large potato farms this proportion amounts to 30 per cent., or about one-third, while for the small farms it is 49 per cent., or about one-half of the total farm real estate value. By examining the average values of the buildings on the small and on the large farms, it is apparent that while the large farms have a smaller proportion of their capital invested in buildings, yet they are far better equipped. The average value of the dwellings on the small farms is but $1,655, while that on the large farms is $4,367. This means the farmers on large areas are more comfortably housed at a smaller proportionate expense. The same relation is true of the barn and sheds, but to a lesser degree, since, although a large farm requires more barn and shed capacity, this is obtained at a smaller relative cost than on the small farms.

Table XXVIII.—Relation of Size of Farm to Buildings and Building Investment on 149 Farms Operated by Tenants in Monmouth County, New Jersey.

| Crop Acres. | No. of Farms. | Average Value of All Buildings. | Per Cent. of Total Real Estate Capital. | Value of Dwelling. | Per Cent. of Total Real Estate Capital. | Value of Barn. | Per Cent. of Total Real Estate Capital. |
|---|---|---|---|---|---|---|---|
| 30 or less, ...... | 4 | $1,950 | 41.5 | $1,375 | 28.9 | $575 | 12.6 |
| 31 to 50, ....... | 12 | 2,890 | 37.8 | 1,750 | 22.9 | 1,140 | 14.9 |
| 51 to 75, ....... | 33 | 4,130 | 30.5 | 2,448 | 18.0 | 1,682 | 12.5 |
| 76 to 100, ...... | 62 | 5,912 | 32.4 | 3,538 | 13.9 | 2,374 | 18.5 |
| 101 to 150, ...... | 33 | 6,091 | 26.1 | 3,106 | 13.3 | 2,985 | 12.8 |
| 151 and over, ... | 5 | 9,300 | 30.0 | 4,000 | 14.1 | 4,300 | 15.9 |

The same relation exists for the tenant farms, but to a less marked degree. The average building investment for the tenant farms is 30.8 per cent., or somewhat less than the building investment on owner farms. The average investment on the owner farms for dwellings is $2,932, and barns $2,046, while on the tenant farms it is $3,014 for dwellings and $2,340 for barns. The dwelling investment is relatively higher on the owner farms while the barn investment is higher on the tenant farms when considered from the standpoint of total real estate value. Naturally landlords would not care to build expensive dwellings to accommodate tenants. Still, the average value of these buildings would tend to show that they do have an investment large enough to furnish comfortable living conditions. The proportionate investment on the small tenant farms is twice the amount of that on the large farms. Thus the landlord makes a greater saving than the owner since he does not increase the investment in the house as rapidly as does the owner with the increase of size. However, he does increase the investment of his barns more rapidly than does the owner as size of farm increases. It is quite evident, therefore, that the owner or tenant can live more comfortably and have a better dwelling on the larger-sized farm than he could on the small one, while at the same time at a smaller proportionate expense or at a lower proportionate charge against the farm for living. This is a factor of much importance when we consider that the farmer's place of business is his home. From this standpoint farming differs from manufacturing or other commercial industries where a man has his office located at his place of business with his home at an entirely different place. The business man thus considers his location from the standpoint of successful business operation. The farmer must consider it from the standpoint of a home as well as of business. It is thus important that the farm be large enough to afford a comfortable home without too heavy a charge against the income.

## RELATION OF SIZE OF FARM AND CROP ACRE VALUE

Small farms frequently sell for more per acre than large farms. When we consider that the cost of buildings upon these small farms is proportionately greater, it is right that they should bring relatively more since the improvements per acre are proportionately greater.

Table XXIX.—Relation of Size of Farm to Farm Value and Crop Acre Value on 194 Potato Farms Operated by Owners in Monmouth County, New Jersey.

| Crop Acres. | No. of Farms. | Average Farm Value. | Crop Acre Value. | Farm Acre Value. | Per Cent. Farm Area in Crops. |
|---|---|---|---|---|---|
| 30 or less, | 20 | $5,015 | $223.90 | $156.40 | 70.1 |
| 31 to 50, | 35 | 8,671 | 209.00 | 157.60 | 75.3 |
| 51 to 75, | 54 | 13,531 | 209.20 | 153.60 | 73.4 |
| 76 to 100, | 52 | 16,298 | 187.80 | 133.90 | 71.1 |
| 101 to 150, | 27 | 23,352 | 197.40 | 157.90 | 80.1 |
| 151 and over, | 6 | 21,443 | 121.80 | 96.50 | 79.2 |

The total farm value increases with the size, as would be expected. However, the value per crop acre decreases as the number of crop acres increases. The acre value of the small farms is $223.90 per crop acre while that of the larger is $121.80, a difference of $102.10 per crop acre in favor of the large farm. It is quite evident that farm values are not governed by their production values, otherwise the acre value for small farms would be less. A small farm might be likened to the first reapers placed on the market for the farmer to buy. Compared with modern reapers, they were expensive to operate, yet cost considerably more when purchased.

Table XXX.—Relation of Size of Farm to Farm Value and Crop Acre Value on 149 Potato Farms Operated by Tenants in Monmouth County, New Jersey.

| Crop Acres. | No. of Farms. | Average Farm Value. | Crop Acre Value. | Farm Acre Value. | Per Cent. Farm Area in Crops. |
|---|---|---|---|---|---|
| 30 or less, | 4 | $4,750 | $217.90 | $150.80 | 69.0 |
| 31 to 50, | 12 | 7,650 | 186.10 | 132.40 | 73.0 |
| 51 to 75, | 33 | 13,545 | 312.00 | 143.60 | 67.7 |
| 76 to 100, | 62 | 18,226 | 207.50 | 147.30 | 71.1 |
| 101 to 150, | 33 | 23,303 | 197.30 | 137.50 | 69.6 |
| 151 and over, | 5 | 27,600 | 156.30 | 111.20 | 70.8 |

The relative acre values for the tenant farms is very similar to that of the owner farms. However, the crop acre values are somewhat higher on the former than on the latter, for farms of the same size. When computed on the total farm acreage, there is less difference between the acre values of the large and of the small farms. Too frequently farms are valued at their total farm acreage rather than at their total crop acreage. If the remainder of the farm can be placed in crops, this method would not be at fault. But there is always a certain area which cannot be cropped, and this differs much with the individual farm. In the case of the owner farms, there is a larger proportion of waste on the smaller farms. This is to be expected since buildings, roads and fences take proportionately more space on small areas. This amounts to a difference of almost 10 per cent. on the owner farms. For the tenant farms, the percentage of waste area is about the same for all the farms of different size. It appears as though the tenant on the large farms is more wasteful of land than is the owner. The tenants have an average of 70.1 per cent. of their farms in crops while the owners have 74.5 per cent. cropped.

## RELATION OF SIZE OF FARM TO CROP YIELDS

It has for a long time been the popular belief that small farms are better tilled, more carefully farmed, and, therefore, more profitable. In practically all farm surveys this has proved a fallacy. However, the former work applied to grain, hay and extensive types of farm crops. Should this idea prove true in any case, one would expect it to do so in potato farming where intensive methods are employed in the production of the crop. The following tables show just what effect the size of the farm has on the potato yield.

**Table XXXI.—Relation of Size of Farm to Potato Yield on 194 Potato Farms Operated by Owners in Monmouth County, New Jersey.**

| Crop Acres. | No. of Farms. | Crop Acres in Potatoes. | Per Cent. Crop Acres in Potatoes. | Yield of Potatoes Barrels per Acre. |
|---|---|---|---|---|
| 30 or less, | 20 | 9.4 | 42 | 76 |
| 31 to 50, | 35 | 16.9 | 41 | 81 |
| 51 to 75, | 54 | 24.7 | 38 | 82 |
| 76 to 100, | 52 | 30.0 | 34 | 86 |
| 101 to 150, | 27 | 41.8 | 35 | 84 |
| 151 and over, | 6 | 58.5 | 33 | 72 |

The average yield of potatoes on the owner farms is 83 barrels per acre. It appears, as though the size of the farm would have very little influence on the potato yields. Evidently, the growers on the large farms are able to raise as much per acre as the men on the smaller areas. In fact, the highest yields were obtained from the larger farms though the difference is not sufficient to say that the large farms are better yielders. The six farms with over 151 crop acres have the lowest yield, 72 barrels per acre, while the 20 smallest farms have a yield of 76 barrels per acre. This latter may, to some extent, be accounted for by the fact that more varieties other than American Giants were grown on these small farms. This would influence the average yield of this small class unduly.

The per cent. of crop acres in potatoes decreases uniformly as the size of the farm increases. The men of the small areas endeavor to increase the size of their business by growing a larger proportion of potatoes.

**Table XXXII.—Relation of Size of Farm to Potato Yield on 149 Potato Farms Operated by Tenants in Monmouth County, New Jersey.**

| Crop Acres. | No. of Farms. | Crop Acres in Potatoes. | Per Cent. Crop Acres in Potatoes. | Yield of Potatoes Barrels per Acre. |
|---|---|---|---|---|
| 30 or less, | 4 | 6.2 | 28.4 | 80.5 |
| 31 to 50, | 12 | 19.7 | 47.9 | 84.3 |
| 51 to 75, | 33 | 24.5 | 38.3 | 82.8 |
| 76 to 100, | 62 | 29.2 | 33.2 | 86.1 |
| 100 to 150, | 33 | 37.1 | 31.4 | 85.6 |
| 151 and over, | 5 | 61.2 | 34.6 | 85.1 |

The average yield of potatoes on the tenant farms is 84.9 barrels per acre, or almost 2 barrels more than on the owner farms. That the crop acre value is somewhat greater for the tenant farms is borne out by the increased production on these tenant farms. The proper relation of values appears to be established as to their production. The large farms, here again, are showing a production a little above the average. It is safe to conclude, therefore, that large size, such as prevails in this region, does not diminish production. If anything, it has a tendency to give increased yields per acre. Like the owners, the tenants increase the per cent. of their potato areas as the size of farm decreases. For the tenant farms, the average proportion of crop acres in potatoes amounts to 34.4 per cent. of the crop acres, or 29.8 acres of potatoes, while for the owner farms this proportion is 36.1 per cent. of the total crop acres, or 26½ acres of potatoes per farm. One might argue that these smaller potato farms were not producing more per acre because of lack of proper rotation when such a large proportion of the farm is in one crop. More will be said about this later.

## RELATION OF SIZE OF FARM TO RECEIPTS

In order that a profitable business be secured, it is essential that it provide for sufficient receipts so that the proportion of the income that is left after expenses are deducted will afford a satisfactory return for capital and labor invested.

**Table XXXIII.—Relation of Size of Farm to Total Farm Receipts and Crop Acre Receipts on 194 Farms Operated by Owners in Monmouth County, New Jersey.**

| Crop Acres. | No. of Farms. | Total Farm Receipts. | Potato Receipts per Acre. | Receipts per Acre from Crops Other Than Potatoes. | Stock Receipts per Crop Acre. | Total Receipts per Crop Acre. |
|---|---|---|---|---|---|---|
| 30 or less, | 20 | $1.383 | $117.70 | $10.10 | $4.90 | $61.20 |
| 31 to 50, | 35 | 2,519 | 113.70 | 10.70 | 7.50 | 60.70 |
| 51 to 75, | 54 | 3,863 | 115.10 | 14.30 | 5.70 | 59.70 |
| 76 to 100, | 52 | 5,121 | 120.80 | 17.40 | 5.40 | 59.00 |
| 101 to 150, | 27 | 6,920 | 121.60 | 14.80 | 4.50 | 58.50 |
| 151 and over, | 6 | 8,765 | 110.70 | 15.50 | 2.50 | 49.80 |

The total farm receipts are over six times as large on the large farms as on the smaller, yet with the exception of the last class there is very little difference in the total crop acre receipts. There is a tendency for the acre receipts to decrease slightly up to the last class, when they decrease considerably. It would appear that until farms are quite large they are made to produce as much per crop acre for the markets as the small farms. This is in view of the fact that the small farms had a somewhat greater per cent. of their crop acres in potatoes, which is the most profitable crop. The large farms have more hay, rye, wheat and corn to sell since there is more raised than is required to feed the work stock. The stock receipts appear to be about the same per acre for the large and the small farm. In many regions the proportion of stock increases on the smaller farms, but evidently these potato farms find it more profitable to increase their receipts through a greater percentage of potatoes rather than by keeping more stock.

Table XXXIV.—Relation of Size of Farm to Operator's Total Farm Receipts and Crop Acre Receipts on 149 Farms Operated by Tenants in Monmouth County, New Jersey.

| Crop Acres. | No. of Farms. | Operators' Total Farm Receipts. | Operators' Potato Receipts per Acre. | Operators' Receipts per Acre from Crops Other Than Potatoes. | Operators' Stock Receipts per Crop Acre. | Operators' Total Receipts per Crop Acre. |
|---|---|---|---|---|---|---|
| 30 or less, .. | 4 | $926.50 | $90.20 | $12.10 | $4.10 | $42.60 |
| 31 to 50, .. | 12 | 1,820.30 | 72.20 | 8.30 | 4.00 | 44.30 |
| 51 to 75, .. | 33 | 1,967.90 | 60.50 | 5.70 | 3.20 | 30.80 |
| 76 to 100, .. | 62 | 2,664.60 | 63.80 | 7.70 | 3.50 | 30.30 |
| 101 to 150, .. | 33 | 3,424.90 | 63.60 | 7.10 | 3.90 | 28.90 |
| 151 and over, | 5 | 4,760.80 | 59.30 | 4.90 | 2.90 | 26.90 |

The tenants on the smaller farms are making a relatively higher acre return than on the larger farms. This difference is far more marked than on the owner farms. On the four small tenant farms this is accounted for by the fact that they do considerable labor off the farm. Again, their potato receipts per acre are high because they sold round stock to a special market, and thereby obtained higher acre receipts than did the tenants on the larger farms. The amount of live-stock receipts per crop acre is not quite so high as on the owner farms. Evidently, the tenants feel that there is more profit in potatoes than in stock. The four small farms have rather high acre receipts for crops other than potatoes. These are obtained largely from truck. Aside from that, they do not vary materially. It is quite evident that a large area is necessary to obtain satisfactory receipts from the farm. Furthermore, this increased size as found on these farms, does not decrease the acre receipts materially. Surely, then, the larger farms should be the more profitable for the individual farmer both in profit per acre and profit per farm, within the limits found in this survey.

**Table XXXV.—Relation of Size of Farm to Landlord's Return on 149 Potato Farms Operated by Tenants in Monmouth County, New Jersey.**

| Crop Acres. | No. of Acres. | Landlord's Return, Per Cent. |
|---|---|---|
| 30 or less, | 4 | 3.2 |
| 31 to 50, | 12 | 9.6 |
| 51 to 75, | 33 | 8.3 |
| 76 to 100, | 62 | 8.1 |
| 101 to 150, | 33 | 8.3 |
| 151 and over, | 5 | 8.7 |

The size of farms has less effect on the per cent. of returns of the landlord than on the returns of the tenant. Evidently, then, the landlord does not share in the advantages of the large farms to the same extent as does the tenant, since his proportionate return is approximately the same regardless of the number of crop acres. This merely emphasizes the fact that the major portion of the savings due to the size of a farm business is largely on the operator's expenses of the farm, such as man, horse and machinery labor, which are furnished by the tenant. As long as the landlord can rent his farm satisfactorily, he need not increase the size in order to obtain a greater porportionate return for the money invested.

## RELATION OF SIZE TO FARM EXPENSE

Previous tables were given to show that men, horses and equipment do proportionately more work on the large farms. It was also illustrated that the building investment was more efficient on the larger farms. If this is true, the actual cash expense of the large farm operator should be less per acre of crops. The following table will show the expense per crop acre as influenced by the size of different farms:

**Table XXXVI.—Relation of Size to Farm and Crop Acre Expense on 194 Potato Farms Operated by Owners in Monmouth County, New Jersey.**

| Crop Acres. | No. of Farms. | Total Farm Expense. | Labor per Acre, Not Including Operator. | Labor per Acre, Including Operator. | Buildings, Interest and Depreciation per Acre. | Machinery or Equipment,[1] Interest and Depreciation per Acre. | Operator's Total Cash Expense per Acre. |
|---|---|---|---|---|---|---|---|
| 30 or less, | 20 | $901 | $12.7 | $28.4 | $9.1 | $2.4 | $40.1 |
| 31 to 50, | 35 | 1,639 | 13.0 | 21.8 | 7.5 | 2.4 | 39.8 |
| 51 to 75, | 54 | 2,291 | 11.4 | 17.1 | 6.4 | 2.0 | 35.4 |
| 76 to 100, | 52 | 2,817 | 10.9 | 15.3 | 5.4 | 1.8 | 32.4 |
| 101 to 150, | 27 | 3,808 | 11.2 | 14.1 | 4.8 | 1.4 | 32.1 |
| 151 and over, | 6 | 5,406 | 11.0 | 12.8 | 3.1 | 1.3 | 30.7 |

---

[1] Machinery or equipment includes machinery and tools used on the farm.

On the small farms an expenditure of $901 gave a return of $1,383, while on the large farms an expenditure of $5,406 gave a return of $8,765. It is quite essential that a large investment be made in order to get a large return. As the investment increases the returns increase, but more rapidly than do the expenses. One dollar spent on the small farms brings a return of $1.53, while one dollar spent on the large farms brings a return of $1.62. Thus the large farm is a more efficient place to invest the money. The cash labor per acre is somewhat less than that on the smaller farms. The popular idea that the labor cost per acre on large farms is so excessive that they are not profitable, is not substantiated by these results. The small farmers pay proportionately more per acre of crops than do those on the larger areas. This difference might be influenced by the greater proportion of potatoes on the small farms, but later data will show that this would not influence it materially. When the value of the owner's time is included in the labor expense, the acre cost for the small farms is over twice that of the larger ones. The depreciation and interest charge against the small farms is almost three times that of the larger, indicating the more economical use of buildings on the latter. The same is true of the equipment charge per acre. This is almost twice as great on the small farms, and, like the buildings, decreases uniformly with the increase in size. The seed and fertilizer expense is about the same. However, the total cash expense per acre is only three-fourths as much on the large farms as on the smaller.

**Table XXXVII.—Relation of Size to Farm and Crop Acre Expense on 149 Potato Farms Operated by Tenants in Monmouth County, New Jersey.**

| Crop Acres. | No. of Farms. | Total Farm Expense. | Labor per Acre, Not Including Operator. | Labor per Acre, Including Operator. | Buildings, Interest and Depreciation per Acre. | Machinery or Equipment, Interest and Depreciation per Acre. | Operator's Total Cash Expense per Acre. |
|---|---|---|---|---|---|---|---|
| 30 or less. ...... | 4 | $526 | $8.7 | $25.0 | $7.1 | $3.7 | $24.2 |
| 31 to 50, ....... | 12 | 1,194 | 8.9 | 18.2 | 5.6 | 2.4 | 28.2 |
| 51 to 76, ....... | 33 | 1,265 | 8.3 | 14.5 | 5.1 | 2.2 | 19.2 |
| 76 to 100, ...... | 62 | 1,777 | 9.4 | 13.5 | 5.4 | 1.9 | 20.2 |
| 101 to 150, ...... | 33 | 2,138 | 8.9 | 12.1 | 4.1 | 1.7 | 18.1 |
| 151 and over, .... | 5 | 3,046 | 7.4 | 9.0 | 3.7 | 1.1 | 19.4 |

The tenants are making a more economical use of their labor than the owners. The average acre charge for cash labor against the owner farms is $11.40, while that of the tenants is $8.90. This is a charge of $2.50 for the owner farms above that of the tenant farms. With the exception of the five largest farms there is no material difference in cash labor expense per acre for the tenant farms of different size. However, when the operator's time is included there is a material difference. The building depreciation and interest as well as that of the equipment is again higher for the small farms. The tenant's total cash expenses per acre are greater for the small farms, but the difference is not so great as in the case of the owners. For each dollar the tenant on the small farm invests he gets in return $1.76, while on the large area he gets $1.56 (Table XXXIV). It will be noted that the small tenant is getting considerable revenue aside from actual farm income and in that manner has increased his receipts per dollar invested on the farm above that on the larger area. This then accounts for the apparent discrepancy when comparison is made with the statistics of the owner farms.

The actual cash expense is considerably less on the larger areas than on the smaller. On a farm of 100 crop acres, this cash expense, due to greater efficiency, would amount to almost $1,000 less than if this area were divided into four or five farms. For the tenants, this difference would be less since they do not pay for the building repairs and depreciation. Besides, the tenants are somewhat more efficient in the use of their labor. There is still another expense of considerable importance which does not show in the cash item, but should be recalled at this point. It is the horse-labor expense. Most of the horse feed is raised on the farm, and this cost against the farming operations does not appear with current cash expenses. On the owner farms a horse cared for almost twice, and on the tenant farms more than twice, as many crop acres on the large farms as on the small farms. Assuming that it costs $150 a year to keep a horse, this would be an additional crop acre charge of $5 to $10 per acre for the small farmer, when the horses in this area work an average of 15 crop acres.

It is quite evident, therefore, that a large investment is necessary to get large returns, and that the larger farms have a decided advantage in the use of man, horse and equipment labor as well as building expense on these potato farms. The most efficient size appears to be 100 or more crop acres. To what extent this size could be increased effectually above 100 crop acres has not been determined in this area, since no class of farms were found whose income was diminishing because of too great size. The largest class had an average of 176 crop acres, and these made the largest average income of any class. However, it is noticeable that the acre profit is diminishing with this last class. Therefore, the greatest efficiency per acre has been reached and passed. The maximum acre efficiency appears to have been reached between 100 and 150 crop acres. On farms of over 150 acres, or an average of 176 crop acres, the returns per acre diminished rapidly, and that probably is near the maximum size for efficient farms in this potato region.

## PRODUCTION

It is a popular belief that high production is associated with profitable production; that the higher the production the larger is the profit obtained from the farm. Numerous surveys have shown that high production may be made unprofitable when carried beyond a certain point. It has also been shown that some farmers who have the highest production are not making as much money as those who are producing less per acre at a smaller cost. There is a point beyond which it is no longer profitable to spend more fertilizer or labor per acre. After this has been once reached, increased expenditures no longer bring profitable returns. Moreover, just what is the profitable amount to produce can be ascertained only by careful investigation.

## CROP YIELDS

**Table XXXVIII.—Crop Yields of Monmouth County as Found by the Survey for 1914 Compared with the Census Yields for 1909.**

| Crop. | Census Yield per Acre 1909. | Survey Yields per Acre for 1914. | |
|---|---|---|---|
| | | Owners. | Tenants. |
| Potatoes, | 48.0 barrels | 83.0 barrels | 84.7 barrels |
| Corn, | 44.5 bushels | 48.1 bushels | 46.1 bushels |
| Wheat, | 22.2 " | 22.7 " | 22.3 " |
| Rye, | 15.0 " | 13.9 " | 15.6 " |
| Hay, | 1.34 tons | 1.45 tons | 1.4 tons |

All of these yields are above the average for the State except that of rye, which is a little below the average of the census yield of 1909. The yields upon these potato farms are above the average of the county, but the difference is not great excepting for potatoes. One might expect greater increase for the other crops, but these soils are not well adapted to small grains and hay. The residual effects do help to increase the other crop yields, but this residual value is not as great on these light soils as it would be on heavier soil. Again, the better portions of the farms are kept for the potato crop, and this eliminates the more fertile areas for crops other than potatoes whenever a rotation of potatoes for the whole farm is not followed.

Table XXXIX.—Rainfall of Monmouth County for 1909 and 1914, the Census and Survey Years' Rainfall at Freehold.

| Year. | May. Inches. | June. Inches. | July. Inches. | Total. Inches. |
|---|---|---|---|---|
| 1909, | 1.75 | 1.82 | 1.07 | 4.64 |
| 1914, | 2.49 | 3.37 | 4.92 | 10.78 |
| Difference. | .74 | 1.55 | 3.85 | 6.14 |

This may explain the low potato yield obtained by the census for 1909. Since rainfall is to a large extent the limiting factor, a dry season such as that of 1909 would sharply curtail the potato yield. This would probably affect the potatoes more severely than the other crops mentioned, since in the remainder of the year 1909 there was a good rainfall, and the growing season is somewhat different for the other crops; hence, they would not be so much affected as the potatoes.

## POTATO YIELDS AND PROFITS

While the acre production for potatoes on these potato farms is high, that of other crops is not correspondingly large. Potatoes are the main crop while the others are merely accessory. The fact that these soils are not so well adapted to grain and grass crops, and that most attention is devoted to potatoes, does not allow such high yields for other crops.

Table XL.—Relation of Potato Yields to Labor Income on 194 Potato Farms Operated by Owners in Monmouth County, New Jersey.

| Yields per Acre, Barrels. | Average Yield per Acre, Barrels. | No. of Farms. | Per Cent. of Total Number. | Number with Minus Labor Income. | Per Cent. with Minus Labor Income. | Average Labor Income. |
|---|---|---|---|---|---|---|
| 60 or less, .. | 54.2 | 22 | 11 | 11 | 50 | $172 |
| 61 to 70, ..... | 66.1 | 28 | 14 | 10 | 36 | 657 |
| 71 to 80, ..... | 77.3 | 61 | 32 | 13 | 20 | 740 |
| 81 to 90, ..... | 86.5 | 38 | 20 | 2 | 5 | 1,091 |
| 91 to 100, .... | 98.1 | 35 | 18 | 2 | 5 | 1,645 |
| 101 and over, .. | 109.0 | 10 | 5 | 1 | 10 | 1,907 |

There is a direct correlation or relation between the potato yields and labor income. On the first class of farms, with a yield of 60 barrels or less and an average of 54.2 barrels per acre, the owners are losing money. Eleven per cent., or over one-tenth of the whole number, are in this class. It is evident that a yield of 54 barrels of potatoes per acre is not sufficient to cover the cost of producing them. The men who got between 60 and 70 barrels, or an average of 66.1 barrels per acre, made a little money, though it is not a very large amount when the owner's time is deducted. A yield between 54 and 66 barrels per acre is the dividing line for the cost of production of the owner farms when potatoes sell at $1.42 per barrel. The men who have a yield between 80 and 90, or an average of 86.5 barrels per acre, which is 3½ barrels above the average for all the farms, have a labor income which is likewise a little above the average, showing that the returns follow the yield very closely. Only ten farms out of the 194 got 100 barrels or more per acre. The average of these ten farms was 109 barrels, or 31 per cent. above the average. The return of these farms, on the other hand, was $1,907, or over twice that of the average for all the farms. This increased production then is very profitable to the farmer, and brings very high returns for the increased care and expense.

The highest yield of any farm was from 29 acres of Giants, which produced 121 barrels per acre, and 2 acres of Cobblers, producing 112 barrels, or an average for the 31 acres of 120 barrels. This is an increase of 45.4 per cent. above the farm average. In addition to potatoes, this farm had 5½ acres of corn, yielding 75 bushels of shelled grain, 5 acres of hay, yielding 2 tons per acre, and 2 acres of orchard, from which the operator got no receipts. Three cows, 60 chickens, 2 pigs and 3 work horses comprised the total amount of live stock. The operator sold $410 worth of products from the cows and chickens, and received $5,053 for the potatoes and $100 for teaming. This was all from 43½ crop acres and a farm area of 46 acres. The labor income of this farm was $2,169, over twice the average. This farmer used 5 barrels of seed potatoes per acre and 1,800 pounds of 4–8–10 fertilizer, which is about 25 per cent. more fertilizer, and $^{3}/_{10}$ of a barrel more seed than the average. With this extra investment of seed and fertilizer, he got an average yield of 45½ per cent. greater than the average potato yield and 46 per cent. greater than the average for all crops. It is quite likely that he tilled more thoroughly and carefully than his neighbors, but it all proved a good investment. In spite of the fact that the farm was small, this farmer made greater profits by more careful management and more intensive methods than his neighbors on larger areas.

**Table XLI.—Relation of Potato Yields to Labor Income on 149 Potato Farms Operated by Tenants in Monmouth County, New Jersey.**

| Yields per Acre, Barrels. | Average Yield per Acre, Barrels. | No. of Farms. | Per Cent. of Total Number. | Number with Minus Labor Income. | Per Cent. with Minus Labor Income. | Average Labor Income. |
|---|---|---|---|---|---|---|
| 60 or less, .. | 41.1 | 4 | 3 | 2 | 50 | $178 |
| 61 to 70, ..... | 67.7 | 22 | 14 | 4 | 14 | 339 |
| 71 to 80, ..... | 76.9 | 41 | 28 | 1 | 4 | 587 |
| 81 to 90, ..... | 86.2 | 44 | 30 | 5 | 2 | 815 |
| 91 to 100, .... | 96.0 | 30 | 20 | 0 | .. | 1,066 |
| 101 and over, .. | 106.9 | 8 | 5 | 0 | .. | 1,693 |

The average yield of the tenant farms is almost 2 barrels per acre above that of the owner farms. They have a smaller number with yields below 60 barrels per acre, but the same

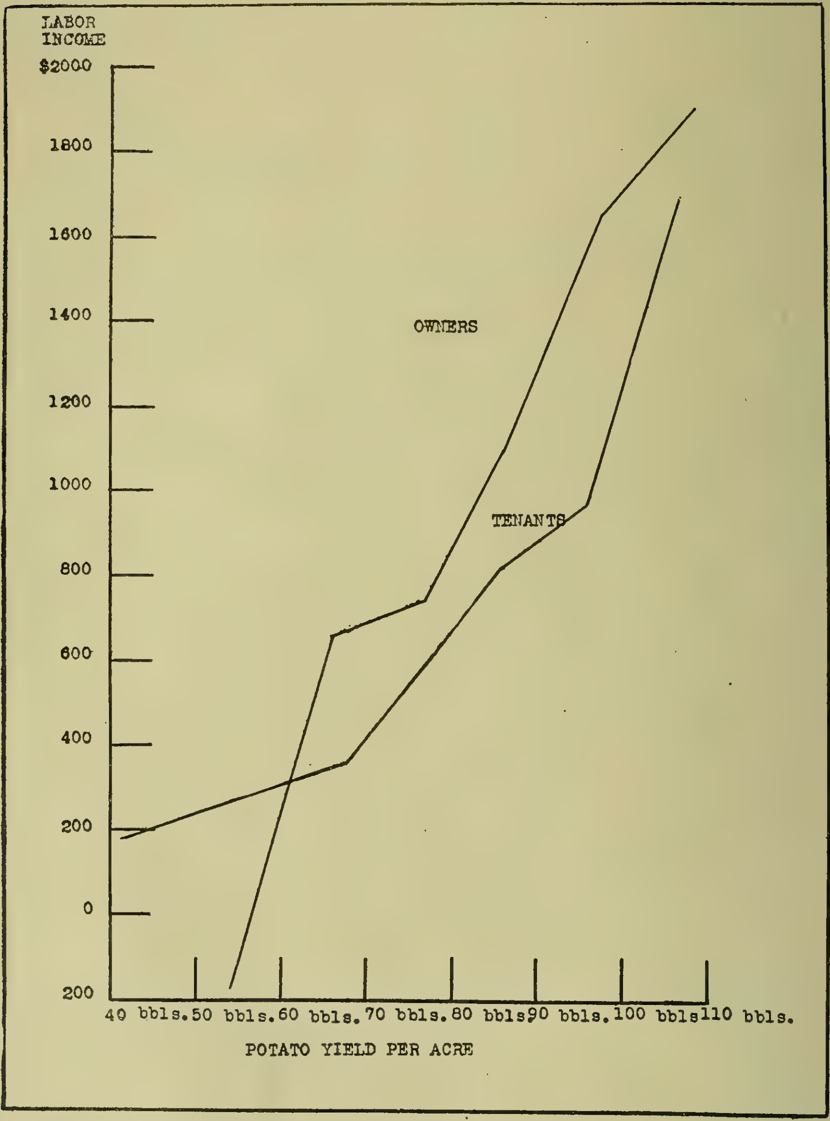

Fig. 22.—Relation of Potato Yield to Labor Income on 343 Potato Farms in Monmouth County, New Jersey.

proportion above 100 barrels per acre. There is a direct relation between the yield and the returns on the tenant farms, as was found on the owner farms. The highest yield in the tenant group was 114 barrels per acre (34 per cent.), or one-third above the average. The tenants do not obtain quite so high a yield as the owners' highest yield. It is expected that they would be more conservative in their investment on production.

## RELATION OF POTATO YIELDS TO EXPENSES

**Table XLII.—Relation of Yield to Expenses on 194 Potato Farms Operated by Owners in Monmouth County, New Jersey.**

| Yield, Barrels per Acre. | No. of Farms. | Crop Acre Expense. | Fertilizer per Acre. | Acres of Potatoes per Farm. | Total Crop Acres per Farm. |
|---|---|---|---|---|---|
| 60 or less, ....... | 22 | $27.10 | $6.70 | 13.6 | 52.8 |
| 61 to 70, ....... | 28 | 32.10 | 8.60 | 26.7 | 75.7 |
| 71 to 80, ....... | 61 | 33.70 | 9.00 | 26.8 | 73.5 |
| 81 to 90, ....... | 38 | 32.40 | 9.50 | 28.7 | 78.6 |
| 91 to 100, ...... | 35 | 35.60 | 9.90 | 30.2 | 79.4 |
| 101 and over, .... | 10 | 45.50 | 12.50 | 31.8 | 63.0 |

The crop acre expenses do not increase proportionately with the increased yield. With the exception of the first and last classes, the difference is not marked. The fertilizer expenses, on the other hand, do increase regularly with increased production. However, much of this increase in fertilizer expense is due to the increased proportion of potato acreage. The high producing farms used a somewhat greater amount of fertilizer than the low producers.

**Table XLIII.—Relation of Yield to Expenses on 149 Potato Farms Operated by Tenants in Monmouth County, New Jersey.**

| Yield, Barrels per Acre. | No. of Farms. | Operators' Crop Acre Expense. | Fertilizer per Crop Acre. | Acres of Potatoes per Farm. | Total Crop Acres per Farm. |
|---|---|---|---|---|---|
| 60 or less, ...... | 4 | $13.60 | $2.90 | 14.0 | 73.0 |
| 61 to 70, ....... | 22 | 18.20 | 4.50 | 21.6 | 80.7 |
| 71 to 80, ....... | 41 | 18.50 | 4.40 | 28.7 | 85.8 |
| 81 to 90, ....... | 44 | 20.10 | 4.30 | 31.7 | 93.0 |
| 91 to 100, ...... | 30 | 22 80 | 5.40 | 34.7 | 84.2 |
| 101 and over, .... | 8 | 20.50 | 5.90 | 37.3 | 90.1 |

The tenants' expenses are very similar to those of the owners in relation to both total current expenses per acre and fertilizer expense per crop acre. Since the share tenant pays for but half of the fertilizer, the acre cost is low, as it represents only half of the total fertilizer expense.

## RELATION OF POTATO YIELDS TO LABOR

Table XLIV.—Relation of Production to the Man, Horse and Equipment Labor on 194 Potato Farms Operated by Owners in Monmouth County, New Jersey.

| Yield, Barrels per Acre. | Crop Acres per Man. | Crop Acres per Horse. | Crop Acres per $100 Equipment. | Work Units per Man. | Work Units per Horse. |
|---|---|---|---|---|---|
| 60 or less, ...... | 26.6 | 13.8 | 9.0 | 200 | 80 |
| 61 to 70, ....... | 27.9 | 14.3 | 10.0 | 204 | 83 |
| 71 to 80, ....... | 27.8 | 15.1 | 8.8 | 208 | 89 |
| 81 to 90, ....... | 27.1 | 13.6 | 9.3 | 214 | 85 |
| 91 to 100, ...... | 28.8 | 13.8 | 7.8 | 217 | 82 |
| 101 and over, .... | 22.9 | 11.6 | 5.7 | 208 | 84 |

The men and horses appear to be far more efficient on the more productive farms since they handle just as large an acreage of crops whether the yield is high or low. This is emphasized again when measured by work units. The men on the more productive farms get their labor at the same acre cost as those on the low producing areas, while their receipts are much larger as will be shown later.

Table XLV.—Relation of Production to Man, Horse and Equipment Labor on 149 Potato Farms Operated by Tenants in Monmouth County, New Jersey.

| Yield, Barrels per Acre. | Crop Acres per Man. | Crop Acres per Horse. | Crop Acres per $100 Equipment. | Work Units per Man. | Work Units per Horse. |
|---|---|---|---|---|---|
| 60 or less, ...... | 36.5 | 20.9 | 16.8 | 199.8 | 77.0 |
| 61 to 70, ....... | 35.1 | 16.4 | 11.9 | 222.8 | 93.0 |
| 71 to 80, ....... | 34.1 | 15.1 | 10.8 | 255.9 | 84.6 |
| 81 to 90, ....... | 33.2 | 15.6 | 11.2 | 229.8 | 88.3 |
| 91 to 100, ...... | 22.8 | 14.2 | 10.1 | 219.5 | 86.6 |
| 101 and over, .... | 31.0 | 15.0 | 8.2 | 233.3 | 90.4 |

As previously noted the tenants are more economical in their use of labor, and here again it contrasts with that of the owners. Though the difference is not great, there does appear to be some relation between production and number of acres of crops handled per man. When measured by work units, and thus considering the proportion of potatoes per farm, the men on the low producing farms accomplish less than on the high producing farms. The same relation is not true for the horse labor. Horses appear to handle just as large a crop acreage whether it is a high or a low producing farm. High production does not materially affect the acre cost on these farms as shown by the preceding data. The machinery investment on the other hand does increase. The high producing farms are better equipped, a condition which may increase the efficiency of equipment labor. If a farmer with the same man and horse labor cost can produce twice the yield by skillful cropping and a slightly increased investment in fertilizer and seed, this should be a very attractive manner of increasing profits on these farms. On the whole these results are not surprising. The main increased labor cost we would expect to be for picking the potatoes and hauling them to the railroad. Picking is a minor item among a large number of more important ones. Again, on most of the farms the hauling of a large or a small yield would not necessitate the farmer's buying an extra team of horses. Costs such as cutting seed, plowing, digging, etc., remain about the same regardless of production.

## RELATION OF POTATO YIELDS TO FARM VALUES

Table XLVI.—Relation of Production to Real Estate Values and Receipts on 194 Potato Farms Operated by Owners in Monmouth County, New Jersey.

| Yield, Barrels per Acre. | Value per Acre. | Potato Receipts per Acre. | Other Crop Receipts per Acre. | Stock Receipts per Crop Acre. | Total Acre Receipts. |
|---|---|---|---|---|---|
| 60 or less, ...... | $101.20 | $81.30 | $12.70 | $3.00 | $33.80 |
| 61 to 70, ....... | 111.70 | 103.10 | 12.70 | 5.20 | 50.10 |
| 71 to 80, ....... | 143.90 | 111.20 | 13.10 | 5.90 | 55.40 |
| 81 to 90, ....... | 153.70 | 118.80 | 15.70 | 5.30 | 59.80 |
| 91 to 100, ...... | 160.00 | 138.80 | 18.60 | 4.80 | 69.60 |
| 101 and over, .... | 205.10 | 150.10 | 29.90 | 5.30 | 96.80 |

The high producing farms have a greater acre value, as one would expect. However, they are comparatively not as high as the low producing farms since these high producers are twice as valuable per acre as are the low producers, while the receipts are almost three times as great. This is very striking when, with the same approximate labor cost per acre and a little increased fertilization, it is possible to obtain three times the receipts. The low value and low production of these farms may be due to several causes. In the first place, some of these farms are naturally more fertile and more productive than others; again, low production and low farm values are often due to the lack of care and poor tillage given the farm by the operator. The latter may often be the cause of low production rather than the lack of fertility in this region. A poorly tilled and operated farm will not be valued as high as one maintained in a more productive state.

Table XLVII.—Relation of Production to Real Estate Values and Tenants' Receipts on 149 Potato Farms Operated by Tenants in Monmouth County, New Jersey.

| Yield, Barrels per Acre. | Value per Acre. | Potato Receipts per Acre. | Other Crop Receipts per Acre. | Stock Receipts per Acre. | Total Acre Receipts. |
|---|---|---|---|---|---|
| 60 or less, ...... | $109 | $39.10 | $3.50 | $1.10 | $14.00 |
| 61 to 70, ....... | 104 | 58.20 | 6.40 | 3.90 | 24.70 |
| 71 to 80, ....... | 125 | 55.20 | 6.10 | 3.90 | 27.90 |
| 81 to 90, ....... | 156 | 64.30 | 7.60 | 3.50 | 30.80 |
| 91 to 100, ...... | 156 | 72.40 | 8.10 | 2.90 | 37.10 |
| 101 and over, .... | 185 | 69.90 | 10.20 | 4.10 | 42.60 |

The farm acre value of the tenant farms is somewhat less than that of the owner farms. So, too, are the acre receipts for potatoes on the former less than half those on the latter. The tenants' stock receipts on the other hand are more than those of the owners; moreover, the tenant does not always share all the stock receipts as he does the crops, and therefore he has a better bargain on his stock than on crops.

The most important bearing this table has from the tenant's standpoint is the fact that if he rents a naturally low productive farm he gets no greater proportion of the receipts than he does on the high producing one. At the same time the cost of his horse and man labor spent on a high producing farm will bring the tenant much larger returns than if spent upon a low producing one. A tenant should consider this fact carefully in renting. Hence on a naturally low producing farm he should have a larger proportion of the receipts than on the more productive place.

## RELATION OF PRODUCTION TO SUCCESS

**Table XLVIII.—Opportunities for Making a Given Labor Income with a Certain Acre Production on 194 Potato Farms Operated by Owners in Monmouth County, New Jersey.**

| Yield, Barrels per Acre. | No. of Farms. | Labor Income | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Less than $1. | $1 to $400. | $401 to $700. | $701 to $1,000. | $1,001 to $1,500. | $1,501 to $2,000. | $2,001 to $2,500. | $2,501 and Over. |
| 60 or less, ...... | 22 | 11 | 10 | .. | 1 | 0 | 0 | 0 | 0 |
| 61 to 70, ........ | 28 | 10 | 6 | 2 | 1 | 3 | 3 | 0 | 3 |
| 71 to 80, ........ | 61 | 11 | 11 | 10 | 13 | 6 | 2 | 2 | 6 |
| 81 to 90, ........ | 38 | 2 | 5 | 5 | 4 | 11 | 7 | 2 | 2 |
| 91 to 100, ....... | 35 | 2 | 3 | 8 | 2 | 9 | 1 | 3 | 7 |
| 101 and over, ..... | 10 | 1 | 0 | 1 | 1 | 1 | 1 | 2 | 3 |

As production increases, the opportunities for making a good return are greater. For the 22 farmers with a production of less than 60 barrels per acre, one-half are losing money, while only one has a labor income of over $400. For the men who have a yield of 100 barrels or more per acre one-half get over a $2,000 labor income return. There is a steady increase in the number of successful farms as production increases.

**Table XLIX.—Opportunities for Making a Given Labor Income with a Certain Acre Production on 149 Potato Farms Operated by Tenants in Monmouth County, New Jersey.**

| Yield, Barrels per Acre. | No. of Farms. | Labor Income | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Less than $1. | $1 to $400. | $401 to $700. | $701 to $1,000. | $1,001 to $1,500. | $1,501 to $2,000. | $2,001 to $2,500. | $2,501 and Over. |
| 60 or less, ...... | 4 | 2 | 2 | .. | .. | .. | .. | .. | .. |
| 61 to 70, ........ | 22 | 4 | 10 | 4 | 4 | .. | .. | .. | .. |
| 71 to 80, ........ | 41 | 1 | 13 | 14 | 7 | 3 | 3 | .. | .. |
| 81 to 90, ........ | 44 | 5 | 8 | 9 | 7 | 6 | 5 | 3 | 1 |
| 91 to 100, ....... | 30 | .. | 6 | 6 | 2 | 9 | 2 | 5 | .. |
| 101 and over, ..... | 8 | .. | .. | 1 | .. | 3 | 1 | 2 | 1 |

The number of tenants who make high labor incomes with large production, increases more uniformily with production than does the number of owners. Since much of this profit is due to greater efficiency in labor expended, the tenants should show a more uniform increase in the proportion making large returns. Of the four tenants whose production was less than 60 barrels per acre, none made over $400, while of the eight tenants who had a production of 100 barrels or more, all but one made a labor income of over $1,000.

High production then does not guarantee success, but it is one of the essential factors for success on these farms. Of the owners only 10, or 5 per cent., of the total number got a production of one-fifth above the average, while for the tenants, 8, or 5 per cent., likewise had a yield of over 100 barrels. Thus only a small proportion get much above the average, and of these farms it is not in any case 50 per cent. above the average. The highest producing farm was that of an owner whose potato yield was 45.4 per cent. above the average. However, the average potato production of these farms as a group is high. When any industry has been developed to a high degree, such as the production of potatoes in this region, it becomes more difficult to raise the individual farm above the average standard for the region. To what extent increased fertilization, seed, and green manures would bring profitable returns, has not been fully ascertained on these farms. The most profitable production may have been reached, but it has evidently not been passed by any class of farms as the profits have all increased uniformly with increased yield. Again, the highest producing farm showed the highest acre profit. This argues well for high production, and it certainly is paying well to raise large acre yields of potatoes in this region. The farms located on favorable soils could produce at least one-tenth to one-fifth above the average with profit. On the other hand, it must not be understood that high production guarantees success on these farms. It is one of the major factors controlling success, and therefore must be included as one of the essentials for success. Production depends upon many factors, some of which are not within the farmers' control, such as rainfall and temperature. If these are not favorable to production, increased labor, fertilizer, and care for the crops, will bring no proportionate returns since the latter are not the limiting factors of production.

## COST OF POTATO PRODUCTION

No work was done to determine the acre and bushel cost of potato production of these farms. By the farmers this is frequently estimated at $60 to $70 per acre. They seldom include depreciation and interest in their estimation. Out of the 370 potato farms, there were 25 from which practically nothing but potatoes was sold. The operators of these farms were putting nearly all their efforts in the production of potatoes. Other crops were raised, and some stock kept, the latter for family use, and the crops mainly to keep the horses, a few cows, hogs and chickens.

**Table L.—Acre Cost of Producing Potatoes on 25 Potato Farms in Monmouth County, New Jersey.**

| | |
|---|---|
| Total acres of potatoes, | 919 |
| Labor expense, | $21 58 |
| Cost of potato seed, 4.85 bbls., | 10 76 |
| Fertilizer expense, | 24 94 |
| Machinery depreciation, | 2 35 |
| Spraying materials, | 51 |
| Barrels. | 55 |
| Cover crop seed, | 73 |
| Taxes, | 3 10 |
| Insurance, | 94 |
| Interest, | 21 72 |
| Grass seed per acre, | 92 |
| Miscellaneous, | 7 62 |
| Total acre expenses, | $95 72 |
| Receipts from crops other than potatoes, divided by the number of acres of potatoes, | 10 57 |
| Cost per acre of potatoes, | $85 15 |
| Yield per acre, | 92.1 bbl. |
| Cost per barrel, | 0.92 |
| Cost per bushel, | 0.33 |

This is arriving at the cost of production in a different manner than usual. None of these farms had over 10 per cent. of their receipts from any source except potatoes. The whole had an average of 7.8 per cent. of their total receipts from a source other than potatoes. These receipts have been deducted from the current cost so that the figure arrived at, 33 cents per bushel or 92 cents per barrel, must be quite representative of the production cost of potatoes in this region. It represents the actual cost of raising potatoes when the man has his house, garden and products to use for his family in addition to what the receipts show for his efforts. The receipts per acre for potatoes were $123.48, leaving a margin of $38.33 per acre for these farms. The average price received for the potatoes was $1.45 per barrel, and the average labor income of these farms was $2,123. Some of these items may be considered high, *e. g.*, fertilizer per acre. This is true if we consider the application of fertilizer to potatoes alone. But a limited amount was purchased to apply to corn, which was raised to feed stock and work horses. The spraying cost may be considered low, but very little spraying material is used except arsenicals, and these are not used in all cases. Interest may appear quite high, yet the best part of the farm is used for potatoes, and other crops are raised to feed the horses necessary to have in raising the crop. Hence it is not as excessive as it may appear.

An acre cost of $85.15 would represent a conservative figure for the cost of producing potatoes in this area for 1914. On these 25 farms, this would be 33 cents per bushel, or 92 cents per barrel. When potatoes sell at $1.42 cents per barrel, their normal price for the 7 years up to 1915, a margin of 50 cents per barrel is left. Hence, a grower who has an average production makes about $40 per acre on potatoes.

## PROPORTION OF CROP ACRES IN POTATOES

That the potato crop is profitable has already been fully demonstrated. Just to what extent of specialization it will lend itself with profit can be demonstrated only by isolating those farms producing the largest proportion of the crop. There are numerous factors to consider when we desire to increase or decrease the area of a certain crop, but the most important consideration is the results to be obtained through any change of crop area. Returns will show whether there is a lack of proper maintenance of fertility, the establishing of the wrong rotation or the wasteful use of labor.

## RELATION OF PROPORTION OF CROP ACRES IN POTATOES TO PROFITS

**Table LI.—Relation of Proportion of Crop Acres in Potatoes to the Labor Income on 194 Farms Operated by Owners in Monmouth County, New Jersey.**

| Per Cent. Crop Acres in Potatoes. | No. of Farms. | Crop Acres per Farm. | Potatoes, Acres per Farm. | No. with Minus Labor Income. | Per Cent. Minus Labor Income. | Average Labor Income. | Av'age Per Cent. Crop Acres in Potatoes. |
|---|---|---|---|---|---|---|---|
| 20 or less, .. | 27 | 80.8 | 13.6 | 5 | 18.5 | $442 | 16.8 |
| 21 to 30, .... | 48 | 75.6 | 20.0 | 14 | 29.2 | 464 | 26.3 |
| 31 to 40, .... | 47 | 75.6 | 26.7 | 12 | 25.5 | 788 | 35.3 |
| 41 to 50, .... | 38 | 67.6 | 30.8 | 6 | 16.0 | 1,081 | 45.5 |
| 51 to 60, .... | 16 | 61.8 | 34.0 | 1 | 6.0 | 1,611 | 55.1 |
| 61 and over,.. | 18 | ~~68.8~~ 69.6 | 48.0 | 1 | 6.0 | 2,127 | 69.6 |

The highest profitable proportion of potatoes has apparently not been reached. The last class of 68.8 per cent. of the crop acres in potatoes shows the highest profit. This may be near the limit of the most profitable proportion, but it has certainly not passed it. The difference is striking and strongly emphasizes the fact that potatoes are the most desirable enterprise in this area. That they adapt themselves well to specialization is indicated by these results. That the farms with a high potato acreage should furnish a labor income of almost five times as much as the farms with a small acreage in potatoes is quite convincing.

Table LII.—Relation of Proportion of Crop Acres in Potatoes to Labor Income on 149 Tenant Farms in Monmouth County, New Jersey.

| Per Cent. Crop Acres in Potatoes. | No. of Farms. | Crop Acres per Farm. | Potatoes, Acres per Farm. | Average Labor Income. | Average Per Cent. Crop Acres in Potatoes. |
|---|---|---|---|---|---|
| 20 or less, ...... | 11 | 78.0 | 13.8 | $186 | 17.7 |
| 21 to 30, ........ | 47 | 95.1 | 23.8 | 483 | 25.0 |
| 31 to 40, ........ | 45 | 92.2 | 31.9 | 888 | 34.6 |
| 41 to 50, ........ | 27 | 77.0 | 34.3 | 1,002 | 44.5 |
| 51 to 60, ........ | 11 | 72.5 | 39.3 | 968 | 54.2 |
| 61 and over, ..... | 8 | 71.2 | 46.9 | 1,224 | 65.8 |

The tenants do not have such a large proportion of farms with a high percentage of potatoes. After 50 per cent. or half of their crop acres are in potatoes the labor income increase for the tenant is not as marked as for the owners. The tenants who have an average of 44 per cent. of their crop acres in potatoes have a labor income of $1,002, while the highest class, with 66 per cent., or two-thirds of their crop acres in potatoes, have a return of $1,224. The owners in this class secure a return of $2,127. It is not as profitable for the tenants to have an exceedingly high proportion of potatoes as for the owners. This, too, is emphasized by the fact that a smaller number of tenants have such a large proportion of their crop acres in potatoes. On examining the cost of producing potatoes, as previously shown, this is explained. The expenses for labor, fertilizer, and seed furnished by the tenant remain about stationary. The landlord's interest charge against potatoes will decrease with the increasing proportion of potatoes planted. Therefore, the tenant's expenses per crop acre remain about the same, while the landlord's decrease. Thus it is a more profitable crop for the landlord as well as for the owners operating their own farms. While potatoes are profitable for the tenants, they are comparatively more profitable to the owners and landlords.

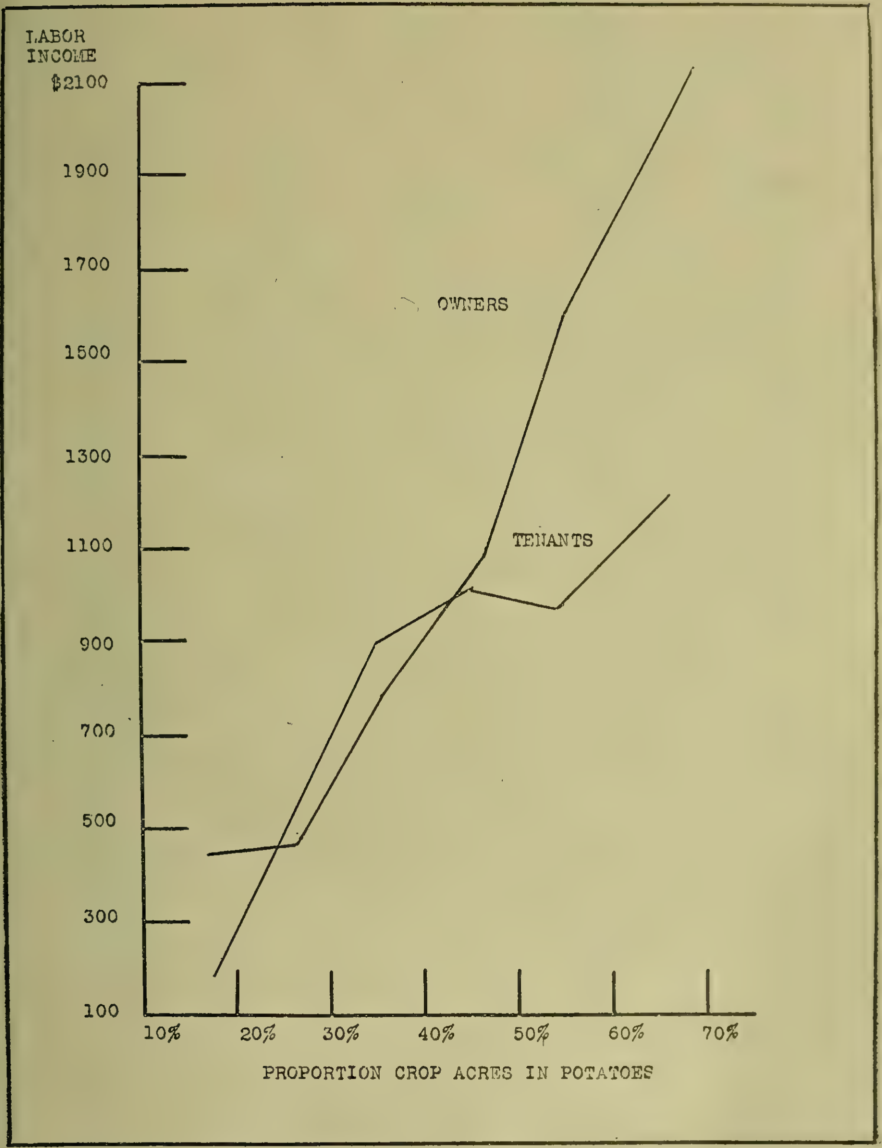

Fig. 23.—Relation of Proportion of Crop Acres in Potatoes to Labor Income on 343 Farms in Monmouth County, New Jersey.

## RELATION OF PROPORTION OF CROP ACRES IN POTATOES TO RECEIPTS

### Table LIII.—Relation of Proportion of Crop Acres in Potatoes to Receipts on 194 Potato Farms Operated by Owners in Monmouth County, New Jersey.

| Per Cent. of Crop Acres in Potatoes. | Potatoes, Receipts per Farm. | Potatoes, Receipts per Acre. | Other Crop Receipts per Farm. | Other Crop Receipts per Acre. | Stock Receipts per Farm. | Stock Receipts per Acre. | Total Farm Receipts. | Total Acre Receipts. |
|---|---|---|---|---|---|---|---|---|
| 20 or less, ....... | $1,552 | $114.00 | $931 | $13.90 | $349 | $4.30 | $2,850 | $35.30 |
| 21 to 30, ......... | 2,218 | 111.50 | 1,003 | 18.00 | 331 | 4.40 | 3,586 | 47.40 |
| 31 to 40, ......... | 3,119 | 116.80 | 712 | 14.60 | 495 | 6.50 | 4,442 | 58.70 |
| 41 to 50, ......... | 3,621 | 117.70 | 415 | 11.30 | 344 | 5.10 | 4,421 | 65.40 |
| 51 to 60, ......... | 4,291 | 126.60 | 676 | 24.40 | 361 | 5.80 | 5,345 | 86.60 |
| 61 and over, ..... | 5,889 | 122.90 | 195 | 9.30 | 348 | 5.10 | 6,346 | 92.30 |

Receipts per acre of potatoes increase slightly with the increase in proportion of acres in potatoes. The farm receipts for all crops other than potatoes are greater on the farms with a smaller proportion of crop acres in potatoes, but the crop acre receipts for these crops do not vary uniformly with the increase of potato acreage. The stock receipts per farm are about the same, though the farms with less potatoes have somewhat more stock. The total farm receipts and acre receipts, including receipts from miscellaneous sources, are much greater per farm, as well as per acre, on the areas having a high proportion of potatoes.

### Table LIV.—Relation of Proportion of Crop Acres in Potatoes to Receipts on 149 Potato Farms Operated by Tenants in Monmouth County, New Jersey.

| Per Cent. of Crop Acres in Potatoes. | Potatoes, Receipts per Farm. | Potatoes, Receipts per Acre. | Other Crop Receipts per Farm. | Other Crop Receipts per Acre. | Stock Receipts per Farm. | Stock Receipts per Acre. | Total Farm Receipts. | Total Acre Receipts. |
|---|---|---|---|---|---|---|---|---|
| 20 or less, ....... | $875 | $63 | $296 | $4.90 | $292 | $3.7 | $1,519 | $19.5 |
| 21 to 30, ......... | 1,380 | 58 | 499 | 6.90 | 364 | 3.8 | 2,267 | 23.8 |
| 31 to 40, ......... | 2,169 | 69 | 469 | 7.80 | 367 | 4.0 | 3,042 | 34.1 |
| 41 to 50, ......... | 2,086 | 61 | 386 | 9.00 | 182 | 2.4 | 2,736 | 35.2 |
| 51 to 60, ......... | 2,458 | 63 | 155 | 4.90 | 239 | 3.3 | 2,891 | 39.9 |
| 61 and over, ..... | 3,092 | 66 | 43 | 1.70 | 186 | 2.6 | 3,362 | 47.1 |

The relation of tenants' receipts to the proportion of crop acres in potatoes, is very similar to those of the owners', except that on the tenant farms, receipts from other crops and stock decrease with an increased proportion of potatoes. The tenant must use a larger portion of his hay and corn to feed his horses, leaving a smaller proportion to sell. The owner farms, too, have relatively less stock on the farm with a high proportion of potatoes, yet the receipts from the stock are about the same. Evidently, more efficient use is made of the stock on the latter farms.

## RELATION OF PROPORTION OF CROP ACRES IN POTATOES TO EXPENSE

**Table LV.—Relation of Proportion of Crop Acres in Potatoes to Expenses on 194 Potato Farms Operated by Owners in Monmouth County, New Jersey.**

| Per Cent. of Crop Acres in Potatoes. | Total Current Farm Expense. | Total Current Acre Expense. | Farm Fertilizer Cost. | Acre Fertilizer Cost. | Cash Labor Cost per Farm. | Cash Labor Cost per Acre. |
|---|---|---|---|---|---|---|
| 20 or less, ..... | $1,675 | $20.70 | $391 | $4.80 | $568 | $7.00 |
| 21 to 30, ...... | 2,313 | 30.60 | 575 | 7.60 | 847 | 11.20 |
| 31 to 40, ...... | 2,551 | 33.70 | 669 | 8.80 | 913 | 12.10 |
| 41 to 50, ...... | 2,618 | 38.70 | 723 | 10.70 | 893 | 13.20 |
| 51 to 60, ...... | 2,489 | 40.30 | 802 | 13.00 | 726 | 11.80 |
| 61 and over, .. | 3,302 | 48.00 | 1,123 | 16.30 | 952 | 13.80 |

The expenses increase materially with the increased potato acreage, and of these expenses fertilizer is the one which increases the most. Labor increases slightly, but not to such a great extent as one might suppose. Again, the receipts and expenses are not only far greater on the farms high in potato acreage, but the proportion of the receipts used for the expenses is smaller on the farm high in potato acreage. Thus the latter farms are doing business in a more economical manner than is the case where less potatoes are raised and more from other crops. It is a good indication that the farms of high potato acreage are not approaching diminishing returns due to over specialization.

**Table LVI.—Relation of Proportion of Crop Acres in Potatoes to Expenses on 149 Potato Farms Operated by Tenants in Monmouth County, New Jersey.**

| Per Cent. of Crop Acres in Potatoes. | Total Current Farm Expense. | Total Current Acre Expense. | Farm Fertilizer Cost. | Acre Fertilizer Cost. | Cash Labor Cost per Farm. | Cash Labor Cost per Acre. |
|---|---|---|---|---|---|---|
| 20 or less, .... | $1,171 | $15.20 | $210 | $2.60 | $618.30 | $7.80 |
| 21 to 30, ..... | 1,602 | 16.80 | 323 | 3.30 | 779.30 | 8.20 |
| 31 to 40, ..... | 1,884 | 21.10 | 467 | 4.90 | 857.10 | 9.00 |
| 41 to 50, ..... | 1,614 | 20.90 | 391 | 5.10 | 742.60 | 9.70 |
| 51 to 60, ..... | 1,740 | 24.00 | 440 | 6.00 | 702.70 | 9.80 |
| 61 and over, .. | 2,011 | 28.20 | 693 | 9.70 | 695.00 | 9.50 |

The tenants need to use a larger proportion of their receipts to meet current expenses than the owners. While they get but half of the receipts, their current expense is more than half of the owners' on the same type of a farm. When comparing the owners and tenants, it is quite noticeable that the tenants have only about three-fourths so heavy a cash labor expense as the owners. As with the owners, the cash labor expense is somewhat greater for farms higher in potato acreage, but the difference is not large.

## RELATION OF PROPORTION OF CROP ACRES IN POTATOES TO LABOR

### Table LVII.—Relation of Proportion of Crop Acres in Potatoes to Man, Horse and Equipment Labor on 194 Potato Farms Operated by Owners in Monmouth County, New Jersey.

| Per Cent. Crop Acres in Potatoes. | Crop Acres per Man. | Crop Acres per Horse. | Crop Acres per $100 Equipment. | Work Units per Man. | Work Units per Horse. |
|---|---|---|---|---|---|
| 20 or less, ...... | 35.3 | 17.9 | 12.6 | 220.2 | 85.5 |
| 21 to 30, ........ | 26.5 | 14.1 | 9.5 | 202.1 | 80.6 |
| 31 to 40, ........ | 27.1 | 13.5 | 8.2 | 215.6 | 83.5 |
| 41 to 50, ........ | 25.8 | 13.1 | 7.4 | 200.1 | 81.7 |
| 51 to 60, ........ | 25.3 | 11.4 | 7.0 | 230.2 | 86.2 |
| 61 and over, ..... | 22.9 | 11.7 | 7.7 | 195.6 | 93.2 |

While the crop acres per man, horse and equipment labor are more for the farms with less potatoes, if we omit the first class the difference is not great. By examining the man and horse work units, which are a more accurate measure as they include the live stock and give the proper value to all the different crops for all the labor performed upon them, we find the men and horses get practically the same amount of work accomplished on all the farms regardless of potato acreage.

### Table LVIII.—Relation of Proportion of Crop Acres in Potatoes to Man, Horse and Machinery Labor on 149 Potato Farms Operated by Tenants in Monmouth County, New Jersey.

| Per Cent. Crop Acres in Potatoes. | Crop Acres per Man. | Crop Acres per Horse. | Crop Acres $100 of Equipment. | Work Units per Man. | Work Units per Horse. |
|---|---|---|---|---|---|
| 20 or less, ...... | 32.4 | 15.9 | 13.9 | 192 | 72.0 |
| 21 to 30, ........ | 34.8 | 17.2 | 11.1 | 226 | 87.5 |
| 31 to 40, ........ | 31.2 | 15.5 | 11.2 | 238 | 89.2 |
| 41 to 50, ........ | 27.6 | 13.1 | 10.0 | 230 | 86.4 |
| 51 to 60, ........ | 28.8 | 12.9 | 8.2 | 257 | 89.6 |
| 61 and over, ..... | 27.6 | 12.9 | 11.6 | 261 | 99.6 |

As on the owner farms, the number of crop acres per man, horse and $100 worth of equipment is greater on the farms with the smaller potato acreage. Again, the difference is not striking. The man and horse work units are, on the other hand, greater per man and per horse on the farms having the larger potato acreage. According to the data, these farms with a high proportion of all crop acres in potatoes are more economical and efficient in the use of labor than are those with a smaller acreage of potatoes, but with a larger proportion of other crops and stock. In this locality potatoes lend themselves to high specialization, and are fully as economical in the use of horse and man labor as are other crops and stock, when a more diversified type of farming is followed. Diversification, with a larger number of crops and with more stock, does not provide for the use of labor more efficiently on these farms. In many localities this would not be true, but here potatoes give a fairly uniform distribution of labor.

Some of the plowing is done during the winter whenever a period of favorable weather prevails. The soils are light and become dry in a very short time after rains. Hence, tillage is not as greatly hindered by adverse weather conditions as would be the case in a heavier soil. Ordinarily, plowing is fairly well completed by the latter part of March. Planting usually begins at this time and lasts up to the middle of April. Cultivation begins as soon as planting is completed and lasts up until July. Digging begins in this month and continues until October. After digging the fields are seeded to cover crops. This leaves but a short interval during July when other labor does not conflict with potatoes. During the late fall and winter the potato fertilizer and seed is hauled while some of the plowing is done the latter part of the winter. During the break in July the hay and winter grain, if grown, is harvested. These two crops do not conflict materially with potatoes. Potatoes, as grown in this region, allow high specialization without lessening the labor efficiency. In fact, it appears to make a more even distribution than is found on many general crop farms.

## RELATION OF PROPORTION OF CROP ACRES IN POTATOES TO YIELD

**Table LIX.—Relation of Proportion of Crop Acres in Potatoes to Yield on 194 Potato Farms Operated by Owners in Monmouth County, New Jersey.**

| Per Cent. of Crop Acres in Potatoes. | No. of Farms. | Farm Yield, Bbls. | Acre Yield, Bbls. |
|---|---|---|---|
| 20 or less, | 27 | 1,018 | 74.7 |
| 21 to 30, | 48 | 1,598 | 80.3 |
| 31 to 40, | 47 | 2,156 | 80.7 |
| 41 to 50, | 38 | 2,539 | 82.5 |
| 51 to 60, | 16 | 3,001 | 88.2 |
| 61 and over, | 18 | 4,129 | 86.2 |

These data look very promising for the more highly specialized farms. The yields are not only being maintained, but are slightly increased, with an increase in the proportion of potatoes. This is in view of successive cropping, which is a more frequent practice on the farms having a high potato acreage.

Table LX.—Relation of Proportion of Crop Acres in Potatoes to Yield on 149 Potato Farms Operated by Tenants in Monmouth County, New Jersey.

| Per Cent. of Crop Acres in Potatoes. | No. of Farms. | Farm Yield, Bbls. | Acre Yield, Bbls. |
|---|---|---|---|
| 20 or less, | 11 | 981 | 71.0 |
| 21 to 30, | 47 | 1,893 | 79.3 |
| 31 to 40, | 45 | 2,752 | 85.1 |
| 41 to 50, | 27 | 3,050 | 88.9 |
| 51 to 60, | 11 | 3,454 | 87.7 |
| 61 and over, | 8 | 4,148 | 88.2 |

The tenants, too, have a higher acre yield upon the farms with the highest potato acreage. This is a very convincing answer to the frequently asked question whether the highly specialized potato farms in Monmouth County can maintain their fertility, organic matter, and yield without a more careful rotation than many of the more prominent growers follow. Their yields are being not only maintained but increased. Successive cropping evidently does not have an injurious effect upon the potato yield. As long as diseases can be kept under control there appears to be no material danger from successive cropping. Whether this will be continued indefinitely can be determined only by future results in this area. Some unknown factor may enter to change conditions, but the present indications show no danger.

## RELATION OF PROPORTION OF CROP ACRES IN POTATOES TO SUCCESS

Table LXI.—Relation of Proportion of Crop Acres in Potatoes to a Given Labor Income on 194 Potato Farms Operated by Owners in Monmouth County New Jersey.

| | | Labor Income | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Per Cent. Crop Acres in Potatoes. | No. of Farms. | Less than $1. | $1 to $400. | $401 to $700. | $701 to $1,000. | $1,001 to $1,500. | $1,501 to $2,000. | $2,001 to $2,500. | $2,501 and Over. |
| 20 or less, | 27 | 5 | 6 | 7 | 4 | 4 | 1 | ... | .. |
| 21 to 30, | 48 | 14 | 10 | 8 | 3 | 9 | 1 | 0 | 3 |
| 31 to 40, | 47 | 12 | 8 | 2 | 5 | 7 | 3 | 6 | 4 |
| 41 to 50, | 38 | 6 | 5 | 7 | 5 | 6 | 4 | 1 | 4 |
| 51 to 60, | 16 | 1 | 4 | 1 | 1 | 4 | 4 | 0 | 1 |
| 61 and over, | 18 | 1 | 1 | 1 | 3 | 2 | 1 | 2 | 7 |

Farms in all classes lost money regardless of the potato acreage. However, the losses were less frequent on the farms with the larger proportions of potatoes, while on farms with 70 per cent. of the crop acres in potatoes over one-third the total number of owners made a labor income of over $2,500. Only one farm out of 27 produced over $1,500 in the class with less than 20 per cent. crop acres in potatoes.

**Table LXII.—Relation of Proportion of Crop Acres in Potatoes to a Given Labor Income on 149 Potato Farms Operated by Tenants in Monmouth County, New Jersey.**

| | | Labor Income | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Per Cent. Crop Acres in Potatoes. | No. of Farms. | Less than $1. | $1 to $400. | $401 to $700. | $701 to $1,000. | $1,001 to $1,500. | $1,501 to $2,000. | $2,001 to $2,500. | $2,501 and Over. |
| 20 or less, ...... | 11 | 3 | 4 | 3 | 1 | .. | .. | .. | .. |
| 21 to 30, ........ | 47 | 6 | 17 | 13 | 3 | 6 | 2 | .. | .. |
| 31 to 40, ........ | 45 | 3 | 11 | 5 | 9 | 9 | 4 | 3 | 1 |
| 41 to 50, ........ | 27 | .. | 6 | 7 | 4 | 2 | 4 | 3 | 1 |
| 51 to 60, ........ | 11 | .. | 2 | 3 | 2 | 2 | 0 | 2 | 0 |
| 61 and over, .... | 8 | .. | .. | 2 | 1 | 2 | 2 | 1 | 2 |

The results for the tenants are more clearly defined than for the owners. Here none of the tenants who had 41 per cent. or more of their farm in potatoes lost money.

It is quite evident that these farms have at least not passed the highest profitable proportion of potatoes. The highest profits are obtained when two acres out of every three are planted to the potato crop. The third crop acre will furnish sufficient feed for the work horses and a few cows, pigs and chickens necessary to supply the farmer's table with butter, milk, eggs, and meat. A single crop which permits successive cropping without decreasing its production, which makes economical use of man, horse and machinery labor, and which provides for a large farm business on a moderate-sized farm, makes a very successful crop for specialization. Potatoes on these farms prove to be the crop having all these characteristics. One other crop deserves attention at this point, namely, alfalfa, which is found on a comparatively few places, averaging about an acre per farm. While it would interfere somewhat with the labor of potato raising in June and August or September, yet it might furnish a far more satisfactory hay crop than the grasses. This is especially true on the farms with a small acreage, since it would allow a larger area for potatoes and corn. While a few farmers are adopting alfalfa in this capacity, the number is not so great as it should be in order to bring the greatest profit. The crops then might be alfalfa for hay for the horses and a few cows or other stock, corn for horses and stock, with the remainder of the farm in potatoes so far as the soils will permit. This would make the most profitable crop combination for these farms. This would eliminate a large area of grass for hay, and rye and wheat for grain to sell, as these soils are not well adapted to grass and small grains. However, rye is a desirable crop to grow with cowpeas or soybeans in securing sufficient organic matter to build up the soils which are light or deficient in organic content.

The potato thus lends itself admirably to specialization. It is efficient in the use of labor and equipment. It provides for good profits, and continuous culture is not decreasing the yield.

This is an instance when specialization rather than diversification is most profitable. The prevailing opinion of men interested in farm management work that diversity and stock are essential to highest profits is erroneous if applied to an area such as this potato region. Recommendations in farm management practice should be made with the same consideration as when recommending a fertilizer application. With certain conditions certain principles are applicable. Too broad applications should not be made.

Live

## ~~VEIL~~ STOCK

Many types of farming other than truck-raising and fruit growing or similar intensive types, require that a certain proportion of live stock be kept in order to maintain fertility, distribute labor more uniformly, add to the diversity, and use up waste products or cheap feed from the farm. Surveys on such areas usually show that a certain amount of live stock brings greater profit to the farmer, and it is recommended that stock be added to the farm business. This potato area has many farms which keep only sufficient stock to furnish the farmer's family with milk, butter, eggs and meat. Years ago these farms were far more heavily stocked, and at present we sometimes hear it deplored that the region has let its live-stock industry diminish to such a marked degree. The following data will show to what extent these farms should increase or decrease their live stock in order to have the proper proportion.

### RELATION OF LIVE STOCK TO LABOR INCOME

Table LXIII.—Relation of Live Stock to Profits on 194 Potato Farms Operated by Owners in Monmouth County, New Jersey.

| Stock Receipts, per Cent. of Total. | No. of Farms. | Productive Animal Units per Farm. | Labor Income. | No. with Minus Labor Income. |
|---|---|---|---|---|
| 0 to 5, ......... | 63 | 3.6 | $1,256 | 15 |
| 5.1 to 10, ....... | 63 | 5.2 | 803 | 12 |
| 10.1 to 20, ....... | 44 | 5.7 | 740 | 8 |
| 20.1 to 30, ....... | 13 | 7.9 | 612 | 1 |
| 30.1 and over, .... | 11 | 10.5 | 742 | 3 |

As the farmers increase the stock on the farm, their profits decrease. The farms having an average of 3.6 productive animal units or an equivalent 3 cows and 60 chickens, which is the equivalent of one cow for each 20.9 crop acres, make a larger labor income than any of the succeeding classes which have more stock. The relation is consistent for all excepting the last class, which increases slightly above that of the preceding group.

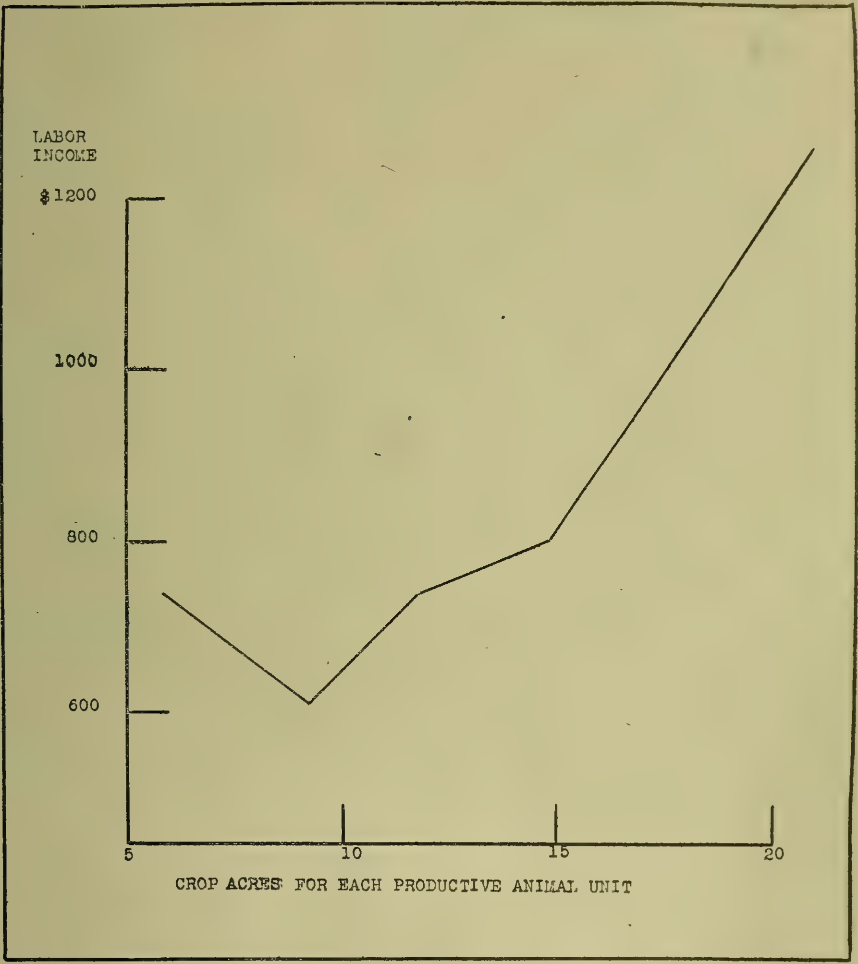

Fig. 24.—Relation of Live Stock to Profits on 194 Farms Operated by Owners in Monmouth County, New Jersey.

Several factors bear upon this last class to make it approach higher profits. Eight out of eleven of these farms are situated on the edge of the typical potato region and this location influences their stock returns abnormally.

Table LXIV.—Relation of Live Stock to Profits on 149 Potato Farms Operated by Tenants in Monmouth County, New Jersey.

| Stock Receipts, per Cent. of Total. | No. of Farms. | Productive Animal Units per Farm. | Labor Income. | No. with Minus Labor Income. |
|---|---|---|---|---|
| 0 to 5, ......... | 35 | 4.5 | $891 | 1 |
| 5.1 to 10, ....... | 38 | 6.6 | 682 | 5 |
| 10.1 to 20, ....... | 48 | 6.2 | 733 | 4 |
| 20.1 to 30, ....... | 21 | 10.5 | 696 | 2 |
| 30.1 and over, .... | 7 | 11.6 | 749 | 0 |

The tenant farms do not show the same relation as do those of the owners. This may be influenced by the fact that the tenants do not always share the stock receipts with the landlord. In such a case the tenants have a better bargain in live stock than in potatoes, and should receive comparatively greater returns. Therefore, as long as the tenants can stock the farms and keep the major portion of their stock receipts, they can afford to keep stock. However, there is no apparent advantage in doing so, for their returns are not any greater than those of the farmers who keep no more stock than what actually is needed for family use.

## RELATION OF LIVE STOCK TO ~~YEILD~~ yield AND FERTILIZERS COST

Table LXV.—Relation of Stock Receipts and Amount of Stock per Farm, to Acre Yields and Fertilizer Cost per Crop Acre on 194 Potato Farms Operated by Owners in Monmouth County, New Jersey.

| Stock Receipts, Per Cent. of Total. | No. of Farms. | Crop Acres for Each Productive Animal Unit. | Acres of Potatoes per Farm. | Other Crop Acres. | Potato Yield per Acre. | Fertilizer Cost per Crop Acre. |
|---|---|---|---|---|---|---|
| 5% or less, ... | 63 | 20.9 | 30.9 | 44.4 | 86.7 | $10.60 |
| 5.1 to 10, .... | 63 | 14.8 | 27.9 | 49.1 | 81.4 | 9.10 |
| 10.1 to 20, .... | 44 | 11.7 | 22.4 | 44.4 | 80.2 | 8.90 |
| 20.1 to 30, .... | 13 | 9.2 | 19.3 | 53.1 | 78.3 | 7.30 |
| 30.1 and over,. | 11 | 5.8 | 17.9 | 42.8 | 73.2 | 9.60 |

The statement that live stock is essential to maintain fertility in extensive farming is not borne out by these figures. In fact, the farms with the smaller proportion of live stock are producing greater acre yields of potatoes than those more heavily stocked. There is a consistent decrease in yield as the proportion of stock increases.

The amount of fertilizer purchased per crop acre is somewhat greater for those with the smaller proportion of live stock. But these farms, too, have a larger proportion of the crops in potatoes. As the major portion of the fertilizer is applied to the potatoes, it is evident that the more heavily stocked farms are using less fertilizer per farm but more per crop acre of potatoes. This might indicate that the stocked areas are on poorer soils, but this does not appear to be the case. From these data it appears that a system of potato farming with green manures and commercial fertilizers is more efficient in maintaining and increasing fertility in ths area than is the use of live stock. The lightly stocked farms purchased about 7 tons of fertilizer more than those heavily stocked. These seven tons of commercial fertilizers, applied with the green manure cover crop, apparently is of more value in adding fertility than are the extra 6.9 animal units on these farms. It is merely a question of balancing one practice against another in maintaining fertility and production on the farm. In this case live stock apparently is not equal to commercial fertilizers and green manure cover crops as they are used in the area.

Table LXVI.—Relation of Stock Receipts and Amount of Stock per Farm, to Acre Yields and Fertilizer Cost per Crop Acre on 149 Potato Farms Operated by Tenants in Monmouth County, New Jersey.

| Stock Receipts, Per Cent. of Total. | No. of Farms. | Crop Acres for Each Productive Animal Unit. | Acres of Potatoes per Farm. | Other Crop Acres. | Potato Yield per Acre. | Fertilizer Cost per Crop Acre. |
|---|---|---|---|---|---|---|
| 5% or less, ... | 35 | 17.4 | 32.7 | 45.8 | 90.4 | $10.30 |
| 5.1 to 10, ..... | 38 | 13.8 | 32.4 | 56.7 | 85.9 | 8.90 |
| 10.1 to 20, ..... | 48 | 13.8 | 28.4 | 58.1 | 81.4 | 8.40 |
| 20.1 to 30, .... | 21 | 8.6 | 25.6 | 65.6 | 82.6 | 7.60 |
| 30.1 and over,. | 7 | 8.8 | 23.0 | 79.7 | 77.0 | 5.30 |

The tenants have larger farms and fertilize a little less heavily than do the owners. The seven farms most heavily stocked have decreased their fertilizer expense to almost half that of the lightly stocked farms. However, they too have only half of the proporton of acres in potatoes as the first class under 5 per cent. stock receipts and with 17.4 acres per animal unit. Comparing live stock with commercial fertilizer and green manure cover crops, the tenants' farms are similar to those of the owners in that the most heavily stocked farms are not so productive as those more lightly stocked.

## RELATION OF LIVE STOCK TO LABOR

Table LXVII.—Relation of Live Stock to Horse and Man Labor on 194 Potato Farms Operated by Owners in Monmouth County, New Jersey.

| Stock Receipts, per Cent. of Total. | No. of Farms. | Productive Animal Units per Farm. | Acres for Each Productive Animal Unit. | Crop Acres per Horse. | Cash Labor per Crop Acre. |
|---|---|---|---|---|---|
| 5% or less, ...... | 63 | 3.6 | 20.9 | 14.1 | $11.60 |
| 5.1 to 10, ....... | 63 | 5.2 | 14.8 | 13.6 | 11.80 |
| 10.1 to 20, ....... | 44 | 5.7 | 11.7 | 13.4 | 11.30 |
| 20.1 to 30, ....... | 13 | 7.9 | 9.2 | 13.6 | 10.60 |
| 30.1 and over, .... | 11 | 10.5 | 5.8 | 13.4 | 9.30 |

The increased proportion of live stock does not materially affect the labor expense upon the farm. But since the farms with most stock have the smallest proportion of potatoes, the direct comparison is not satisfactory. By comparing the farms with 10.5 animal units per farm with those of 3.6, we find on the more heavily stocked farms seven-tenths of an acre less per horse, and $2.30 less per crop acre paid out for labor. On the other hand, these farms have less potatoes, a condition which probably might influence the labor cost to some extent. These stock farms have 13 acres of potatoes less per farm but the same number of other crop acres. These extra 13 acres of potatoes would require considerably more man and horse labor than the stock on the stock farms. In comparison with the previous class the difference is less marked. The live stock does not appear to make any appreciable difference in the more economical use of man or horse labor on these farms.

Table LXVIII.—Relation of Live Stock to Horse and Man Labor on 149 Potato Farms Operated by Tenants in Monmouth County, New Jersey.

| Stock Receipts, per Cent. of Total. | No. of Farms. | Productive Animal Units per Farm. | Crop Acres for Each Productive Animal Unit. | Crop Acres per Horse. | Cash Labor per Crop Acre. |
|---|---|---|---|---|---|
| 5% or less, ...... | 35 | 4.5 | 17.4 | 14.1 | $9.20 |
| 5.1 to 10, ....... | 38 | 6.6 | 13.5 | 15.4 | 10.10 |
| 10.1 to 20, ....... | 48 | 6.2 | 13.8 | 15.7 | 8.20 |
| 20.1 to 30, ....... | 21 | 10.5 | 8.6 | 16.3 | 8.40 |
| 30.1 and over, ... | 7 | 11.6 | 8.8 | 17.9 | 7.80 |

As on the owner farms, there is no relation between cash labor cost and animal units per farm. A better and more satisfactory means of measuring the effect of live stock on the use of labor on these farms is that of the measure of work units.

Table LXIX.—Relation of Live Stock to the Use of Man and Horse Labor on 343 Potato Farms Operated in Monmouth County, New Jersey.

| Stock Receipts, per Cent. of Total. | Owners | | Tenants | |
|---|---|---|---|---|
| | Work Units per Man. | Work Units per Horse. | Work Units per Man. | Work Units per Horse. |
| 5% or less, ...... | 197.6 | 87.8 | 228.2 | 85.8 |
| 5.1 to 10, ....... | 196.4 | 80.7 | 226.5 | 88.1 |
| 10.1 to 20, ....... | 191.8 | 78.9 | 228.6 | 82.3 |
| 20.1 to 30, ....... | 232.1 | 74.8 | 212.5 | 86.1 |
| 30.1 and over, ... | 284.2 | 88.5 | 237.3 | 93.0 |

When measured by the work units, live stock shows no appreciable difference in the more economical use of labor. This, then, is another reason why it is not more profitable on these farms.

## RELATION OF PROPORTION OF LIVE STOCK TO ANIMAL UNIT RECEIPTS

Table LXX.—Relation of Proportion of Total Receipts from Live Stock to Total Stock and Animal Unit Receipts on 343 Potato Farms in Monmouth County, New Jersey.

| Stock Receipts, Per Cent. of Total. | Owners | | Tenants | | Landlords | |
|---|---|---|---|---|---|---|
| | Receipts per Farm. | Receipts per Animal Unit. | Receipts per Farm. | Receipts per Animal Unit. | Receipts per Farm. | Receipts per Animal Unit. |
| 5% or less, .. | $74.10 | $20.30 | $52.40 | $11.60 | $34.70 | $7.70 |
| 5.1 to 10, .... | 309.50 | 59.60 | 204.00 | 30.90 | 62.20 | 9.30 |
| 10.1 to 20, .... | 525.50 | 91.20 | 352.70 | 56.90 | 41.80 | 6.70 |
| 20.1 to 30, .... | 897.80 | 113.60 | 621.10 | 59.00 | 111.70 | 10.60 |
| 30.1 and over,. | 1,198.90 | 114.20 | 900.80 | 87.80 | 259.10 | 22.30 |

On the farms with the lesser number of animal units, most of the stock products are used by the farmer and his famliy. This accounts for the low returns per animal unit. The farms with the higher proportion of stock get good returns from their animals and should be making profits with such returns. However, it is not as much a question of profit but rather a question of what is most profitable. In this case stock is unable to compete with potatoes. These farmers are able to maintain the fertility and give satisfactory employment to their labor without the use of live stock. The amount of cheap feed and pasture in this area is small. Therefore, it is necessary to keep the stock on land high in value and on feed having a high market value. It is quite evident that keeping live stock cannot be done on these farms in a profitable way so long as potatoes are successful. The relation is somewhat different for the tenant farms, since the tenants in many cases do not share the stock receipts. When the landlord furnishes all the land to raise the hay and maintains the buildings the tenant is given a good bargain with stock. This, then, accounts for the tenants' labor income not decreasing as much as that of the owners with the greater amount of live stock kept on the farms. However, in no case would it appear advantageous for the region to increase its live stock above the amount needed to supply the farmers' family. After this need is met, a greater amount adds nothing to the profits of farms adapted to potato production. This again is a diversion from the results reported in nearly all other surveys made up to the present time. It is universally supposed that stock is needed to give employment to labor during the season when crops are not growing, use up waste products and low grade feed, provide for a more stable income, and make manure to maintain fertility. Yet on these farms none of these platitudes apply. They clearly show that stock does not increase the efficiency in any of these phases. The very fact that stock is decreasing in the area shows that the farmers know that it is not advantageous for the greater number of the individuals. Like all other so-called principles of agriculture, the recommendation that a farmer keep stock so as to increase the receipts from his farm, should be made with careful consideration of his individual conditions, for what is true with one condition is not true with another. There may be a few farms of this area of which stock is profitable, but usually it is not with present conditions.

## DISTANCE FROM THE RAILROAD

For some types of farming the distance to market or the railroad is a very important factor influencing farm profits. On others this is of minor importance. Whether the distance from the market or railroad station is of great importance in the purchase of a farm or the growing of certain crops and animals depends much upon the type of farming. Potatoes are a bulky product to market, and one might expect that the distance to market would be of considerable influence upon the profits and production of potatoes. Practically all of the crop is hauled to the railroad station directly from the field, an operation which requires much labor if the distance is great.

### RELATION OF DISTANCE TO RAILROAD AND PROFITS

Table LXXI.—Relation of Distance to the Railroad Station to Labor Income on 194 Farms Operated by Owners In Monmouth County, New Jersey.

| Miles to Railroad. | No. of Farms. | Per Cent. of Total. | Labor Income. | No. with Minus Labor Income. |
|---|---|---|---|---|
| 1 or less, ........ | 48 | 25 | $1,167 | 6 |
| 1.1 to 2, ......... | 51 | 26 | 842 | 8 |
| 2.1 to 3, ......... | 48 | 25 | 761 | 11 |
| 3.1 to 4, ........ | 20 | 10 | 1,592 | 4 |
| 4.1 and over, ..... | 27 | 14 | 403 | 10 |

The farms nearer to the railroad are making a larger labor income than those farther away. As the distance increases the profits decrease. Owners of the last class of farms having over 4 miles to haul their potatoes are not making more than the hired men. Not only do these situated farther away from the railroad average less profits, but the proportion losing money increases with the distance from the railroad. The men who are between 3 and 4 miles are making unusually large labor incomes. Upon close analysis of this class it is found that they have larger crop areas per farm than any other class, a larger acreage of potatoes, and the highest farm receipts from all three main sources, potatoes, other crops and stock. Further, there were several very unusual farms among these twenty to make the returns very high for the whole number. Since the number of these potato farms rapidly grows less after a distance of 3 miles is exceeded, it is plainly shown that the farmers realize the decreased opportunity in raising potatoes under such conditions. Distance from the railroad station is one of the limiting factors for profitable production of the crop and should not be overlooked by anyone contemplating potato farming.

Table LXXII.—Relation of Distance to the Railroad Station to Labor Income on 149 Potato Farms Operated by Tenants in Monmouth County, New Jersey.

| Miles to Railroad. | No. of Farms. | Per Cent. of Total. | Labor Income. | No. with Minus Labor Income. |
|---|---|---|---|---|
| 1 or less, ......... | 31 | 21 | $904 | 3 |
| 1.1 to 2, .......... | 53 | 35 | 723 | 4 |
| 2.1 to 3, .......... | 24 | 16 | 712 | 0 |
| 3.1 to 4, .......... | 16 | 11 | 568 | 2 |
| 4.1 and over, ..... | 25 | 17 | 786 | 3 |

The difference for the tenants is not as great as that for the owners, due possibly to the fact that the tenant keeps more stock when farther from the railroad. Since the tenant very frequently keeps all the stock receipts from hogs, chickens, and a small number of cows, stock is more profitable for him than for the owner. Nevertheless it is quite evident that profits for the tenant decrease as the distance from the railroad increases.

## RELATION OF DISTANCE TO RAILROAD TO FARM VALUES.

Table LXXIII.—Relation of Distance to Railroad and Farm Values on 194 Potato Farms Operated by Owners in Monmouth County, New Jersey.

| Miles to Railroad. | Farm Value. | Farm Acre Value. | Crop Acre Value. | Farm Acre Value Compared with That of Farms One Mile or Less from Railroad. | Crop Acre Value Compared with That of Farms One Mile or Less from Railroad. |
|---|---|---|---|---|---|
| 1 or less, ......... | $14,297 | $167.30 | $209.00 | $0.00 | $0.00 |
| 1.1 to 2, ......... | 13,559 | 147.60 | 197.70 | —19.70 | —11.30 |
| 2.1 to 3, ......... | 13,363 | 135.80 | 189.70 | —31.50 | —19.30 |
| 3.1 to 4, ......... | 14,801 | 128.40 | 163.00 | —38.90 | —46.00 |
| 4.1 and over, .... | 14,074 | 121.20 | 198.70 | —46.10 | —10.30 |

The farm acre value decreases uniformly with distance from the railroad, but the crop acre value decreases far less. Farms are too frequently valued at their total area without sufficient consideration being given to that part which can be cropped economically. The difference between the crop acre value and farm acre value for the near farms is $41.70, whereas for the distant farms it is $77.50. Farms rated by their crop acres can be bought about as cheap near the railroad as farther away. On the other hand, those near the railroad are much more profitable.

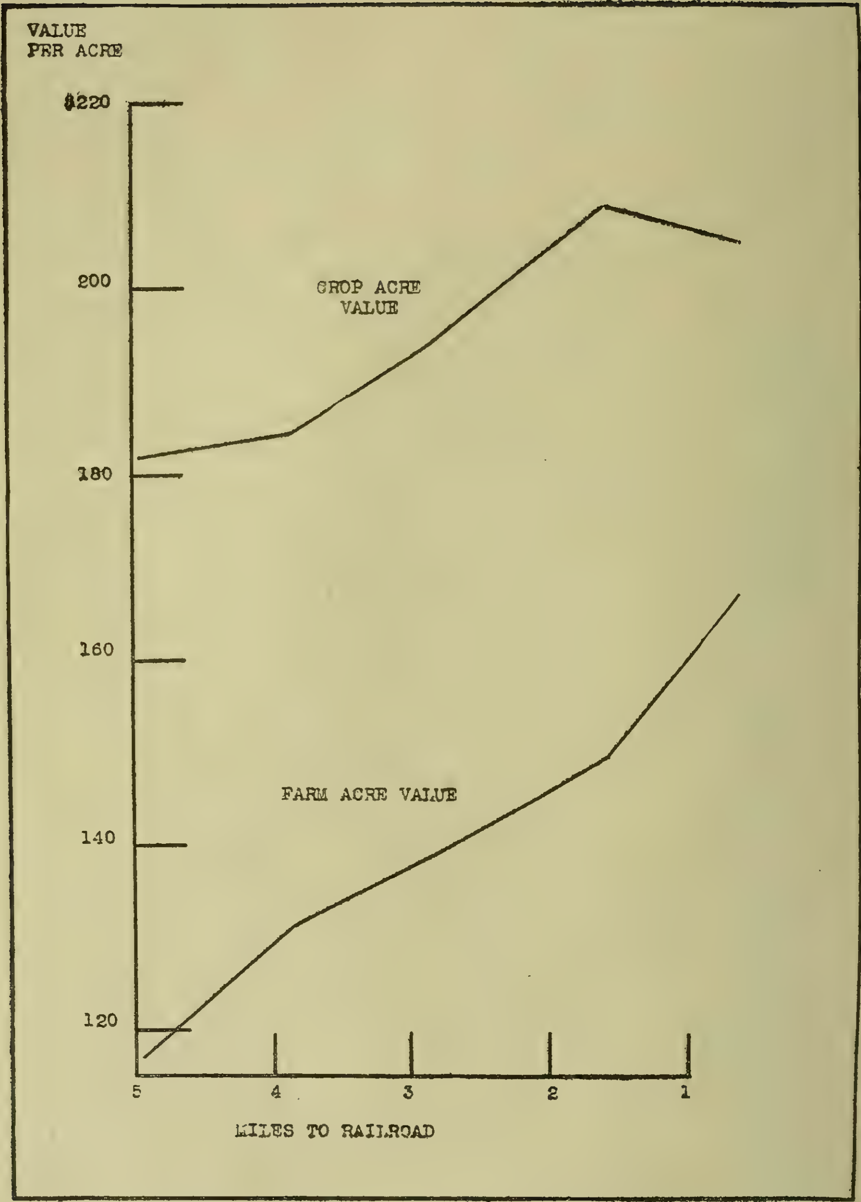

Fig. 25.—Relation of Distance to Railroad to Farm Acre and Crop Acre Value on 343 Potato Farms in Monmouth County, New Jersey.

**Table LXXIV.—Relation of Distance to Railroad to Farm Values on 149 Potato Farms Operated by Tenants in Monmouth County, New Jersey.**

| Miles to Railroad. | Farm Value. | Farm Acre Value. | Crop Acre Value. | Farm Acre Value Compared with That of Farms One Mile or Less from Railroad. | Crop Acre Value Compared with That of Farms One Mile or Less from Railroad. |
|---|---|---|---|---|---|
| 1 or less, ........ | $16,516 | $164.40 | $203.30 | $00.00 | $0.00 |
| 1.1 to 2, ........ | 18,536 | 148.70 | 217.30 | —15.70 | +14 00 |
| 2.1 to 3, ........ | 15,233 | 141.60 | 187.80 | —22.80 | —15.50 |
| 3.1 to 4, ........ | 17,312 | 136.10 | 205.10 | —28.30 | +1.80 |
| 4.1 and over, .... | 15,804 | 105.00 | 165.30 | —59.40 | —38.00 |

The tenant farms decrease less in crop acre value than do the owners, yet the difference is not uniform. The farm values decrease uniformly with an increase in distance, as they should.

The crop acres are the portion of the farm from which the major receipts are derived. Again, a crop acre 4 miles from the railroad would not be worth as much as one a mile away, because of increased cost of operation. When farm values are based upon total farm acreage they are frequently misleading. A calculation based upon the acres which are the source of crop production would be a more accurate method. For the production of potatoes the farms nearer the railroad are comparatively cheaper than those farther away.

## RELATION OF DISTANCE TO RAILROAD TO CROPS, STOCK AND LABOR

**Table LXXV.—Relation of Distance to the Railroad to Crops and Stock on 343 Potato Farms In Monmouth County, New Jersey.**

| | Owners | | | |
|---|---|---|---|---|
| Miles to Railroad. | Acres of Potatoes. | Acres of Other Crops. | Total Crop Acres. | Productive Animal Units per Farm. |
| 1 or less, ........ | 29.6 | 38.8 | 68.4 | 5.0 |
| 1.1 to 2, ........ | 24.1 | 43.5 | 67.6 | 4.8 |
| 2.1 to 3, ........ | 27.5 | 51.5 | 78.0 | 6.2 |
| 3.1 to 4, ........ | 33.2 | 54.5 | 87.7 | 7.2 |
| 4.1 and over, ..... | 19.1 | 51.7 | 70.8 | 5.2 |

| | Tenants | | | |
|---|---|---|---|---|
| Miles to Railroad. | Acres of Potatoes. | Acres of Other Crops. | Total Crop Acres. | Productive Animal Units per Farm. |
| 1 or less, ........ | 36.5 | 44.0 | 80.5 | 3.4 |
| 1.1 to 2, ........ | 28.7 | 56.6 | 85.3 | 4.9 |
| 2.1 to 3, ........ | 29.1 | 61.1 | 90.2 | 6.2 |
| 3.1 to 4, ........ | 26.6 | 67.8 | 84.4 | 5.2 |
| 4.1 and over, ..... | 26.6 | 69.0 | 95.6 | 6.3 |

As the distance from the railroad increases the acreage of potatoes decreases, while the proportion of other crop acres and animal units increases. As the distance increases, therefore, it appears that potatoes are to some extent replaced by other crops, such as corn, rye, wheat and stock. This indicates again that the potato crop becomes less profitable with increased distance.

**Table LXXVI.—Relation of Distance to the Railroad to Work Units on 343 Potato Farms in Monmouth County, New Jersey.**

| Miles to Railroad. | Owners<br>Work Units per Man. | Owners<br>Work Units per Horse. | Tenants<br>Work Units per Man. | Tenants<br>Work Units per Horse. |
|---|---|---|---|---|
| 1 or less, ........ | 180.8 | 82.7 | 212.8 | 92.9 |
| 1.1 to 2, ......... | 207.2 | 79.7 | 220.9 | 85.4 |
| 2.1 to 3, ......... | 206.3 | 84.6 | 248.2 | 85.4 |
| 3.1 to 4, ........ | 239.6 | 91.9 | 224.3 | 81.6 |
| 4.1 and over, ..... | 195.5 | 76.5 | 219.1 | 85.6 |

The distance from the railroad station apparently does not affect the amount of productive work done or number of crop acres handled by men and horses. This is not what one would expect, and there must be some other factor entering into these results. It certainly requires more man and horse labor to raise and haul the potatoes from an acre of land when 4 miles from the railroad than when 1 mile. If we examine the receipts per crop acre for the farms near the railroad, this may be explained.

**Table LXXVII.—Relation of Distance to the Railroad to Receipts on 343 Potato Farms in Monmouth County, New Jersey.**

| Miles to Railroad. | Owners' Acre Receipts<br>From Potatoes. | Owners' Acre Receipts<br>From Other Crops. | Owners' Acre Receipts<br>From Stock per Animal Unit. | Tenants' Acre Receipts<br>From Potatoes. | Tenants' Acre Receipts<br>From Other Crops. | Tenants' Acre Receipts<br>From Stock per Animal Unit. |
|---|---|---|---|---|---|---|
| 1 or less, .... | $127.50 | $14.80 | $70.70 | $62.90 | $6.70 | $61.20 |
| 1.1 to 2,...... | 118.30 | 15.20 | 64.00 | 65.30 | 6.80 | 60.40 |
| 2.1 to 3,...... | 116.90 | 13.50 | 63.80 | 63.90 | 7.00 | 58.70 |
| 3.1 to 4,...... | 138.90 | 16.80 | 75.70 | 55.70 | 9.50 | 48.90 |
| 4.1 and over,... | 123.30 | 14.20 | 54.60 | 65.50 | 6.80 | 69.00 |

The farms near the railroad are obtaining the same receipts per crop acre for all crops and stock as those farther away. Since those farther away have a larger proportion of acres in crops other than potatoes, a smaller proportion of corn, hay, rye or wheat raised is required on the farm for the stock and cover crops. Yet farmers near the railroad sell just as much per acre as those farther away with a larger acreage of crops other than potatoes. Men nearer the railroad are putting more labor on the crops and stock for they are getting higher returns per acre for stock and crops other than potatoes. This greater amount of work upon other crops may account for the use of as much labor per crop acre of potatoes on the farms near the railroad as for those farther away. Again, the hauling of potatoes must be done in a short period during the harvesting. It is possible that the amount of extra time consumed in getting these potatoes to market would not show very markedly in the total work done for the year. Therefore, it is largely a matter of distance and getting the potatoes to the railroad in a comparatively short period. The time necessary for hauling may limit the number of acres planted, and in that way influence profits more than the increased labor involved. It is difficult for a farmer who is located far from the railroad to haul a large acreage of potatoes to the depot, during the harvest season, with his horses and equipment needed to raise them.

Distance to the railroad is a factor influencing profits, proportion of crop acres in potatoes and the labor of marketing. The crop acre value is less influenced than is the real estate value. After a distance of 4 miles from the railroad is reached potatoes rapidly become less profitable.

## FARM EFFICIENCY

In order to measure the efficiency of a farm in its operations it is necessary to establish a measure for the amount of productive work actually accomplished by the men and horses operating the place. To a certain extent this is a measure of a man's ability to handle or manage his men and horses, in order to get a large amount of productive work done. For this measure the work unit is used, intended to represent the average amount of work done in a day by the average workman on the farm. Some men get more work done because they are better managers. They do not necessarily work more days in a year or more hours in a day, but, through good management and careful farm organization, they get more accomplished for the time spent. The size and the arrangement of the farm also will affect the amount of work accomplished per man and horse.

### RELATION OF WORK UNITS AND PROFITS

**Table LXXVIII.—Relation of Productive Work Units per Man to the Profits on 194 Potato Farms Operated by Owners in Monmouth County, New Jersey.**

| Work Units per Man. | No. of Farms. | Number with Minus Labor Income. | Average Labor Income. | Crop Acres. | Work Units per Man. | Work Units per Horse. |
|---|---|---|---|---|---|---|
| 140 or less, .... | 33 | 14 | $53 | 50.8 | 118.2 | 66.8 |
| 141 to 180, .... | 47 | 11 | 700 | 67.7 | 162.1 | 77.8 |
| 181 to 220, .... | 37 | 5 | 895 | 71.2 | 202.2 | 85.7 |
| 221 to 260, .... | 34 | 2 | 1,219 | 81.1 | 240.6 | 88.9 |
| 261 to 300, .... | 23 | 3 | 1,111 | 86.4 | 274.8 | 93.0 |
| 301 and over, .. | 20 | 4 | 2,039 | 96.0 | 354.3 | 103.6 |

The ability to accomplish a large amount of work per man and horse is a very important factor in the success of these farms. It appears almost as important as size and production. Men who get an average of 118 days' work done out of the year have an average labor income of only $53 for the year, while the men who get 354.3 days' work for the year have a labor income of $2,039. As the number of work units per man increases the labor income increases. Also, as the work units per man increase, those per horse increase. The fact that the last 20 men have an average number of work units per man of 354.3 does not necessarily mean that these men must work harder than the others, but merely that they get more accomplished. This may be possible through a number of different agencies, such as size of farm, shape and convenience of fields, ability to plan work properly, or some other agency such as proper equipment, machinery, horses, tools, etc. When time is lost it makes little difference how, for it is a great leakage no matter from what source this loss may occur. Many of these losses can be controlled by the operator, and to a large extent they are a measure of his ability to manage and get work done. These work units might be termed a measure of efficiency in the management of a farm.

**Table LXXIX.—Relation of Productive Work Units per Man to the Profits on 149 Potato Farms Operated by Tenants in Monmouth County, New Jersey.**

| Work Units per Man | No. of Farms. | Number with Minus Labor Income. | Average Labor Income. | Crop Acres per Farm. | Work Units per Man. | Work Units per Horse. |
|---|---|---|---|---|---|---|
| 140 or less, .... | 8 | 3 | $63 | 62.3 | 121.6 | 69.5 |
| 141 to 180, .... | 29 | 3 | 613 | 73.1 | 164.0 | 77.5 |
| 181 to 220, .... | 35 | 2 | 643 | 87.5 | 199.6 | 84.1 |
| 221 to 260, .... | 29 | 1 | 807 | 91.7 | 239.9 | 89.6 |
| 261 to 300, .... | 25 | 2 | 856 | 86.3 | 278.4 | 99.4 |
| 301 and over, .. | 23 | 1 | 1,158 | 105.6 | 353.1 | 95.6 |

The tenant farms show the same relation as the owners' farms, except that there are less men in the class with 140 or less work units. Tenants usually are more economical in the use of labor than the owners. It is necessary that they should be, since they cannot live on the interest of their capital as some owners. This, then, necessitates a greater degree of efficiency on the part of the tenant. The average number of work units per man for the tenant farms is 233.2 per man while for the owners it is 209.2, a difference of 24 work units more per man for these rented farms. An inefficient owner had far better rent his farm to a good tenant. His farm would be of greater value to the community. The men who get only a small amount of work accomplished are not necessarily idle. They may be working just as hard as those getting much done, but it is not productive of profits. Profitable farming consists of raising things to sell. To that end the labor should be employed. It is quite possible for a

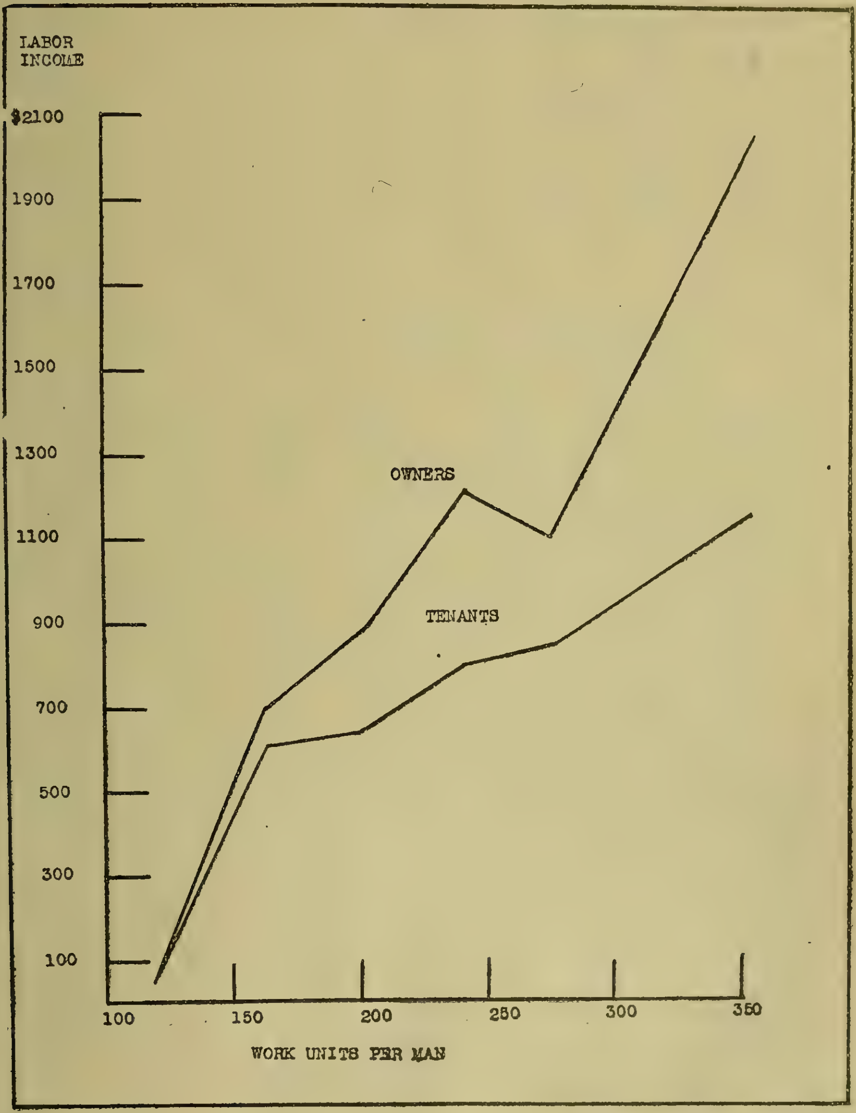

Fig. 26.—Relation of Productive Work Units per Man to Labor Income on 343 Farms in Monmouth County, New Jersey.

man to keep himself and men busy many days of the year at work which brings no return or is not efficiently used. Operations, such as hoeing weeds, that could have been destroyed by timely cultivation, building fancy fences, or plowing when the soil is not in proper condition, are all wasteful of labor.

It is quite noticeable that the size of the farm increases with the number of productive work units per man. Whether this great difference would show in farms of the same size might be questioned. The following divisions in Table LXXX have been made to eliminate the size of the farm as an influencing factor. This method furnishes a more accurate measure of the farmer's efficiency in managing his labor operations for productive purposes on farms of the same size.

**Table LXXX.—Relation of Productive Man Work Units on 194 Potato Farms of Equal Size Operated by Owners in Monmouth County, New Jersey.**

| Productive Work Units per Man. | No. of Farms. | Labor Income. | Crop Acres per Farm. | Work Units per Horse. | Work Units per Man. | Bbls. of Potatoes per Acre. |
|---|---|---|---|---|---|---|
| | Farms of 55 or Less Crop Acres | | | | | |
| 140 or less, ...... | 23 | —$125.00 | 36.9 | 61.0 | 117.1 | 75.9 |
| 141 to 195, ...... | 22 | +341.00 | 34.8 | 71.4 | 167.7 | 74.9 |
| 196 and over, ..... | 21 | 491.00 | 41.6 | 78.3 | 247.4 | 81.1 |
| | Farms of 56 to 85 Crop Acres | | | | | |
| 170 or less, ...... | 19 | $668.40 | 71.2 | 75.0 | 142.9 | 82.3 |
| 171 to 200, ...... | 20 | 894.20 | 73.2 | 74.6 | 189.9 | 85.7 |
| 221 and over, .... | 24 | 1,180.30 | 70.5 | 88.0 | 275.3 | 80.5 |
| | Farms of 86 or More Crop Acres | | | | | |
| 200 or less, ...... | 18 | $668.40 | 112.1 | 77.0 | 158.3 | 82.1 |
| 211 to 250, ...... | 20 | 1,605.50 | 103.2 | 91.6 | 222.9 | 89.0 |
| 251 and over, .... | 27 | 2,229.20 | 117.5 | 100.3 | 308.8 | 80.2 |

Though there are a smaller number of the small farms with a large work unit per man, there is a wide variation in amount of productive work accomplished upon individual farms of the same size. On the small farms the highest average is but 247.4 productive man work units, while on the large farms the highest class is 308.8 productive man work units. In all cases there is a direct relation between the labor income per farm and the number of productive man work units. The same is true of the horse work units, as one might expect. They almost invariably bear the same relation as the man work units. The yield of potatoes on these farms is approximately the same regardless of work units. There appears to be no relation to yield.

**Table LXXXI.—Relation of Productive Man Work Units on 149 Potato Farms of Equal Size Operated by Tenants in Monmouth County, New Jersey.**

| Productive Work Units per Man. | No. of Farms. | Labor Income. | Crop Acres per Farm. | Work Units per Horse. | Work Units per Man. | Bbls. of Potatoes. per Acre. |
|---|---|---|---|---|---|---|
| | Farms of 55 or Less Crop Acres | | | | | |
| 140 or less, ...... | 2 | $129.00 | 16.0 | 38.8 | 77.7 | 86.6 |
| 141 to 195, ...... | 10 | 335.00 | 40.8 | 67.4 | 163.9 | 84.4 |
| 196 and over, ..... | 6 | 708.00 | 41.0 | 89.2 | 252.8 | 82.5 |
| | Farms of 56 to 85 Crop Acres | | | | | |
| 170 or less, ...... | 10 | $287.00 | 71.6 | 62.2 | 145.8 | 90.7 |
| 171 to 220, ...... | 17 | 591.00 | 72.7 | 79.6 | 190.4 | 83.9 |
| 221 and over, ..... | 29 | 799.00 | 71.1 | 82.2 | 278.1 | 85.1 |
| | Farms of 86 Crop Acres and Over | | | | | |
| 200 or less, ...... | 22 | $599.00 | 101.4 | 83.2 | 175.1 | 82.8 |
| 201 to 250, ...... | 24 | 972.00 | 105.6 | 88.3 | 225.8 | 89.0 |
| 251 and over, ..... | 29 | 1,095.00 | 119.7 | 98.7 | 296.5 | 83.6 |

The tenant farms show the same relation as do the owners' farms when divided so as to eliminate the factor of size. That individual men should accomplish so much more work through good management or good organization is to be expected. This is a strong argument for more attention to the efficient operation of the farm. As yet but little interest has been manifested in this phase of agriculture. At present the American farmer is reputed for the relatively high degree of efficiency in his farm operations. But the opportunity for improvement is great. This not only means much to the individual, but also to a marked extent affects the welfare of the state and of the nation.

## RELATION OF THE EFFICIENCY OF THE FARMER TO PROFITS ON THE FARM

Unfortunately, we have no accurate measure to illustrate the efficiency of the individual farmer or the man who is in charge. A great deal of the agricultural teaching would tend to show that success is largely due to the man. This is undoubtedly true in a measure, but not to the extent to which it is credited. No matter how expert or how efficient a man may be, he cannot produce something out of nothing. The manager of a large corporation could not earn $20,000 a year for the company if he were an ordinary laborer, since as a laborer he would not have the opportunity to use his skill to a good advantage. The same is true of the farmer. He must have the necessary conditions for success on a farm before he can show profitable returns. There are some men on small farms who have ability to run a farm properly, yet who rarely have a labor income much above the wages of a hired man. A large and a small farm might be compared with the manager and the laborer of a corporation. Both might be equally efficient and capable, yet the laborer must advance to the position of manager before he can influence the success of the company to any appreciable extent. So too in farming, a man must have the opportunities necessary for success. There are, then, successful men and successful farms. This is a study of successful farms rather than of successful farmers. Failures in farming are due to unsuccessful farms as well as to unsuccessful farmers. The former are more easily measured than the latter. By thus establishing the conditions necessary for a successful farm we eliminate the personal factor which is entirely a different problem. Throughout all this work it will be noticed that not all large farms were successful, not all farms producing high yields were successful, not all farms near to the railroad were successful, indicating that even though the farm is successful the farmer may not be so, a condition which may again cause a marked failure.

The following four farms illustrate lack of efficiency in factors that may be controlled by the operator.

Table LXXXII.—A Comparison of Organization and Incomes on 4 Potato Farms.

| CAPITAL— | Farm No. 1. | Farm No. 2. | Farm No. 3. | Farm No. 4. |
|---|---|---|---|---|
| Real Estate, | $12,000 | $15,000 | $15,000 | $20,000 |
| Live Stock, | 1,061 | 1,823 | 1,825 | 1,465 |
| Machinery, | 579 | 818 | 621 | 1,481 |
| Feed, | 205 | 90 | 504 | 830 |
| Cash, | 1,500 | 2,000 | 500 | 500 |
| Total, | $15,345 | $19,731 | $18,450 | $24,276 |
| **RECEIPTS—** | | | | |
| Potatoes, | $1,800 | $3,120 | $3,200 | $2,552 |
| Other Crops, | 995 | 240 | 930 | 689 |
| Stock, | 358 | 410 | 1,404 | 37 |
| Miscellaneous, | .... | [1] 600 | 20 | .... |
| Total, | $3,153 | $4,370 | $5,554 | $3,278 |
| **EXPENSES—** | | | | |
| Labor, | | $730 | $624 | $1,156 |
| Fertilizer and Lime, | $616 | 522 | 708 | 924 |
| Miscellaneous, | 510 | 910 | 800 | 1,382 |
| | 1,036 | | | |
| Total, | | $2,162 | $2,132 | $3,462 |
| | $2,162 | | | |
| **MAN WORK UNITS—** | | | | |
| Per Man, | 196 | 258 | 314 | 189 |
| **HORSE WORK UNITS—** | | | | |
| Per Horse, | 70 | 74 | 107 | 69 |
| **Receipts from Live Stock—** | I. | II. | III. | IV. |
| Butter, | $30 | $25 | .... | .... |
| Eggs, | 50 | 50 | $312 | $30 |
| Calves, | 15 | 210 | 35 | 270 |
| Hogs, | 84 | .... | .... | .... |
| Pigs, | 54 | 60 | 50 | .... |
| Chickens, | 140 | .... | 50 | 22 |
| Milk, | .... | .... | 800 | .... |
| Capons, | .... | .... | 75 | .... |
| Cows, | .... | .... | 132 | .... |
| Steers, | .... | .... | .... | 40 |

| | I. | II. | III. | IV. |
|---|---|---|---|---|
| Farm Income, | $991 | $2,208 | $3,422 | —$484 |
| Interest on Capital, | 767 | 987 | 923 | —1,209 |
| Labor Income, | 224 | 1,221 | 2,499 | —1,693 |
| Distance to Railroad, | 1¾ Miles. | 2½ Miles. | 2½ Miles. | 2½ Miles. |
| **Crop Acres, Yield—** | | | | |
| Corn (bushels), | 84 | 86 | 87 | 86 |
| Wheat (bushels), | 35 | 50 | 80 | 40 |
| Rye, | 24 | .... | .... | 20 |
| Hay (tons), | 1½ T. | 17 bu. | 1¾ T. | .... |
| Potatoes (barrels), | 1 | 1½ | 1¾ | 1 |
| Apples, | 80 | 80 | 77 | 70 |
| **Stock—** | | | | |
| Horses, | 6 | 6 | 5 | 7 |
| Cows, | 2 | 7 | 7 | 6 |
| Heifers, Calves and Bulls, | 1 | 2 | .... | 1 |
| Hogs, | [2] 8 | 3 | .... | 3 |
| Chickens, | 85 | 60 | 175 | 40 |
| **Crop Acreage—** | | | | |
| Apples, | 1 | .... | .... | 9 |
| Potatoes, | 18 | 30 | 30 | 27 |
| Corn, | 20 | 12 | 16 | 25 |
| Rye, | 20 | 6 | 19 | .... |
| Buckwheat, | 8 | .... | .... | .... |
| Hay, | 10 | 38 | 22 | 15 |
| Wheat, | 7 | .... | .... | 10 |

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[1] From boarding horses. [2] 6 pigs, 1 sow, 1 hog.

These four farms have approximately the same conditions necessary to make money. They have 84 to 87 crop acres, their yields of potatoes ranging from 70 to 80 barrels per acre. The expenses for the first three farms are almost identical, while for the fourth they are about $1,300 more. The receipts for this money spent range from $3,153 to $5,554. The farm with the least expense had the greatest receipts, while the farm with the highest expense had $184 less receipts than the actual expense. The operator spent too much for labor, fertilizer, and seed potatoes, and received for them a low return. The work units per man and per horse were low. The operator of the fourth farm worked at the rate of 189 days out of the year for each man employed and used the horses but 69 days. This is extremely low and shows that the fourth man was a poor manager. His farm had the conditions necessary for success, but he was not successful in conducting it. The third and most successful farm obtained the greatest receipts from the least expense. The operator of this place knew how to handle labor and plan his work so as to get a large amount of work done. This farmer had 314 days' work in the year for each man employed. He knew where to invest money so that it would bring a return. These, then, might be termed successful farms, but the men operating them are not all successful farmers. The public ordinarily blames the farmer for his lack of success, feeling that he is incapable. More frequently this is due to the conditions under which he is working. When these are properly adjusted, farmers as a class are prosperous people. If the proper facilities are not at hand he will tend to become a peasant, as so frequently is the case in European agriculture. Studies such as these throw definite light upon the requirements necessary to develop a strong and prosperous rural people. No industry that is not based upon a strong economic foundation can be successfully maintained. Economic principles, though more difficult to work out, are nevertheless important in American agriculture.

## REORGANIZATION

The reorganization of a farm should be approached in a very conservative manner. Any change will affect the whole system, and therefore much care should be exercised in contemplated changes. In Table LXXXII is given the relative acreage devoted to different crops as found in this survey, together with the relative acreage which the results of this survey indicate to be most profitable.

**Table LXXXIII.—Relative Acreage of Crops in Monmouth County Indicated to be Most Profitable as a Result of This Survey, Compared with the Relative Acreage Found.**

| Present Crops. | | Recommended Crops. | |
|---|---|---|---|
| Crop. | Acres. | Crop. | Acres. |
| Potatoes, | 28.2 | Potatoes, | 50.0 |
| Hay, | 16.8 | Alfalfa or Grass, | 16.0 |
| Corn, | 13.6 | Corn, | 12.0 |
| Rye, | 8.7 | Fruit, | 0.8 |
| Apples, | 3.7 | | |
| Wheat, | 3.4 | | |
| Alfalfa, | 0.9 | | |
| Peaches, | 0.7 | | |
| Truck, | 2.8 | | |
| Total, | 78.8 | Total, | 78.8 |

The rotation for these three crops could be worked out into a 5-year rotation as follows:

**Suggested Rotation.**

| Field. | 1st Year. | 2d Year. | 3d Year. | 4th Year. | 5th Year. |
|---|---|---|---|---|---|
| A, | Potatoes | Potatoes | Potatoes | Grass | Corn |
| B, | Potatoes | Potatoes | Grass | Corn | Potatoes |
| C, | Potatoes | Grass | Corn | Potatoes | Potatoes |
| D, | Grass | Corn | Potatoes | Potatoes | Potatoes |
| E, | Corn | Potatoes | Potatoes | Potatoes | Grass |

Such a rotation would provide for a large proportion of the most profitable crop, furnish sufficient corn and hay for the stock and allow for the maintenance of organic matter so essential in potato farming. The hay should consist largely of clover or alfalfa. As alfalfa is more successfully grown it may well be alfalfa entirely rather than clover and grass. In any case alfalfa should be mixed into the grass seed until it is demonstrated that it can be successfully grown, when alfalfa should be used exclusively with some red clover when desired. This should provide for 2 to 3 tons of hay per acre and leave a large amount of organic matter to plow under. The expense of seeding to hay would not be much greater than seeding to a good cover crop. Anyone desiring to risk the use of lime on potato land could apply ground limestone at the rate of one ton per acre, and harrow in the soil before seeding the grass or alfalfa. Potatoes then would not come on this land until the third year after it was limed. This should to a large extent prevent the growth of scab due to liming for hay. Giants in particular would be adapted to such practice since they are more resistant to scab.

This rotation would require no extra plowing for grass or alfalfa when seeded after potatoes, but only sufficient harrowing to produce a firm compact seed-bed underneath and a fine loose uniform soil mulch on top.

When alfalfa is seeded alone on fields that have never grown it before, considerable care is needed to make it a sure and successful crop. Lime at the rate of 2 to 4 tons of ground limestone, or 1 to 2 tons of burned lime should be applied. The field should be inoculated with 300 to 500 pounds of alfalfa soil taken from another successful alfalfa field. This soil should be screened, broadcasted and harrowed in as soon as applied, in order to prevent the killing of the bacteria by the sun's rays. When a seed bed, free from weeds, compact underneath, loose and fine on the surface is obtained, good clean reliable seed should be sown in August at the rate of 20 pounds to the acre. When this crop is used in the rotation with potatoes, three cuttings can be made of which the first two would be made into hay while the third can be left on the ground to plow under with the sod and furnish more organic matter in the soil. If not needed for this purpose it can be made into hay to sell. There certainly is not nearly the acreage of alfalfa on these farms that can be grown. The large yield of forage of high quality, and the excellent sod for a succeeding crop of corn or potatoes, would warrant a wider use of this hay crop.

## THE CORN CROP

Though this is not a new crop it still is not nearly improved to the extent that it should be in this area. One source of loss is the lack of standard varieties known to be superior for this county. Nearly every farmer grows some unnamed variety obtained from a neighbor sometime during his period of farming. A few varieties known to be superior yielders for the county would add materially to the revenue of these farms with but little added expense. Corn is not as profitable a crop as potatoes on these farms but most farmers may find it profitable to raise enough to feed their stock and work horses. It also furnishes forage and bedding for the stock as well as grain.

### THE POTATO

As the main money crop, this is deserving of most attention. In this area American Giants, commonly called "long stock," are largely grown by most of the farmers. On the 343 potato farms 9,075 acres were of Giants, yielding 84.9 barrels per acre, while 522 acres were of round stock with a yield of 58.2 barrels per acre. This is a marked difference and explains one of the reasons for the greater preference for Giants. Though round stock brings a greater price per bushel, the difference is not sufficient to compensate for the smaller yield of the round stock. Again, but little sorting is necessary for the Giants as they are handled, permitting the use of unskilled laborers for pickers. This, too, is a very hardy potato which resists disease, is smooth with shallow eyes and sells well on the wholesale market. For these reasons this is a very desirable variety to grow on this area. In recent years the most troublesome factor in production of the potato crop is the procuring of good, pure, viable seed free from disease. Practically all of the seed is raised by Maine and New York State growers. Much diseased seed of low quality has been obtained in recent years. This is a serious problem with the farmers, and may compel them to attempt the production of their own seed stock through late planting, which will allow the major growth to be made during cool weather. In some of the southern potato sections as well as in South Jersey, this practice has become a prominent industry, by which the growers produce a seed potato of a very high quality. This, if once known to be successful in this area, would be the satisfactory solution of the seed potato problem for these farms. Not only could they grow potatoes known to be free from disease, but improved strains could be selected in the same manner as when breeding for high producing strains of corn. These are very important problems in this area and need immediate attention. Round varieties, such as Irish Cobbler, Gold Coin, Norcross, Green Mountain and Mills'

Pride, are grown to a limited extent. A few acres of Cobblers are frequently planted to dig and market early to the shore trade. They aid in the labor distribution for the crop and are in good demand for local and retail trade.

## MEASURE OF EFFICIENCY FOR POTATO FARMS IN MONMOUTH COUNTY

Any farm that will measure up to or surpass this standard in all four points is practically sure of success.

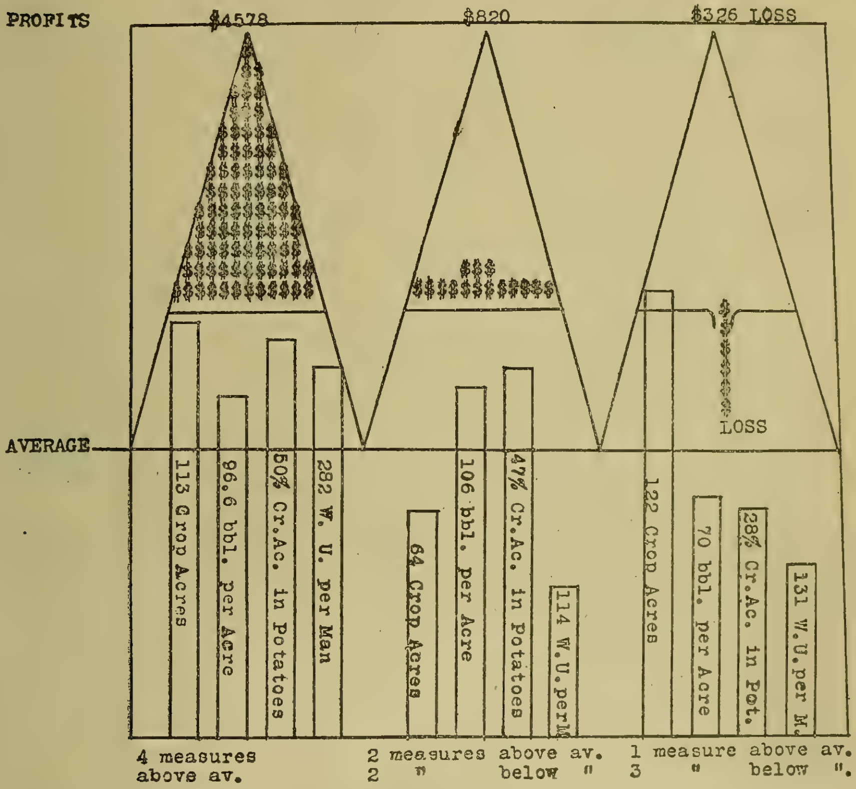

Fig. 27.—Four Measures: Size, Production, Proportion of Crop Acres in Potatoes, and Work Units per Man; and Their Effect on Profits.

Most farms have one or two of these measures as good as or better than the average, many have three as good or better, but only a few are successful enough to have all four major measures, crop acres, potato yield per acre, proportion of crop acres in potatoes and productive work units per man or the number of days' work accomplished by each man on crop and stock. When all four measures are as good as or better than the average, maximum success is obtained. Two measures allow less profit while the third farm with 3 measures below the average lost money. A well organized farm makes a successful farm. It considers all important measures for success.

The average number of crop acres per farm is 78.8; barrels of potatoes per acre, 84; proportion of crop areas in potatoes, 36 per cent., and an average of 219 productive work units per man. One might not expect it to be difficult to find farms which were of the average grade, or better than the average in all these four factors. Yet, out of the total 343 potato farms, there were only 9 owners' farms and 13 tenants' farms, which were as high as or higher than the average in all four points. The operators of these 9 potato owners' farms which met this standard made an average labor income of $4,578 while the 13 tenants made an average labor income of $1,856. None of the operators of these 22 farms lost any money. The lowest labor income for the owners was $1,753, while that for the tenants was $868. A man who can take a farm of 78.8 crop acres or more, obtain a yield of 84 barrels of potatoes or more, have 36 per cent. or more crop acres in potatoes, and get 219 or more productive work units per man done for the year, is apparently certain of profitable returns for his investment and effort. All of these four factors are quite important. Each, as an individual, is important and when all are possessed by one farm, large profits are indicated. Of these 9 potato owner farms, the largest produced a phenomenal return of $10,343, while the largest labor income for the tenant farms was $3,255. One cash tenant who had an unusually good bargain, made a labor income of $3,257, with his work units below the average, although all other factors were above. However, he made it through his low cash rental. Of the total 370 farms, there were none which were 25 per cent. or more above the average in all the four factors, size, potato yield, crop acres of potatoes and man work units. These, then, are four very important measures for a successful potato farm in this area, and can be used by the individual farmer as a standard for measuring his own efficiency.

## SUMMARY

The average labor income for the Monmouth County potato farms included in this survey is $842. The cash tenants have the largest average labor income of $938, while the owners have $917, and share tenants $739.

Forty-five per cent. of the potato farms are operated by tenants.

Cash renting is most profitable for the tenant who is a good farmer.

Landlords get a return of 8.3 per cent. on their investment, not including rise of land values.

The system of share renting is too arbitrary, and does not consider differences as found on individual farms that affect economical farm operations.

Ten per cent. of the owners and part owners get a labor income of over $2,500.

Owners making the highest labor income have between $20,000 and $30,000 capital, tenants between $5000 and $7000, ~~made a labor income of over $2,500~~. and part owners $15,000 to $20,000.

Thirty per cent. of the owners who had a capital between ~~tween~~ $20,000 and $30,000 made a labor income of over $2,500.

Thirty-four per cent. of the tenants who had between $5,000 and $7,000 made a labor income of over $1,500.

Farm owners who have a capital between $20,000 and $30,000 receive a yearly return of $121 per thousand dollars invested.

The owners have 80 per cent. of their capital in real estate, 8 per cent. in live stock, 5 per cent. in equipment, 2 per cent. in supplies and 5 per cent. in cash.

Five per cent. of the total capital invested is in work horses and 3 per cent. in productive live stock.

The average farm investment for the owners is $17,673, for the share tenants $3,369, and for the cash tenants $3,085.

The farm profits increase with the increase of crop acres per farm for both owner and tenant farms.

The larger farms are far more efficient in the use of man, horse and machinery labor than are the smaller farms.

The larger farms have a smaller proportion of their capital invested in buildings.

Farm and crop acre values decrease as size increases for all farms regardless of tenantry.

Landlords receive as great a percentage of money return on small ~~fams~~ as on large farms.
farms

The potato yields are fully as good on large as on small farms. Large receipts are necessary for large profits.

The average sized farm for the owners is 73 crop acres, and for the tenants 87 crop acres.

Size of farm has a direct relation to the depreciation rate to be charged for buildings and equipment.

The average acre yield for potatoes was 83 barrels for the owner farms, and 84.7 barrels for the tenant farms.

Profits are greater with each increase of potato yield per acre.

Men and horses handle as many crop acres on the heavy yielding farms as upon the light yielding farms.

The acre cost of producing potatoes is $85.15. The cost per barrel is 92 cents.

Farmers producing 60 barrels or less per acre lose money.

No class of farmers are raising higher yields of potatoes than are profitable.

Less than one farm out of twenty had a yield 20 per cent. above the average.

The larger the proportion of crop acres in potatoes the greater is the labor income.

The potato crop in this area lends itself admirably to high specialization.

The potato crop affords as good a distribution of labor for the men and horses as more diversified crops.

Lack of rotation is not decreasing potato yields.

Live stock above what is needed for the farmer's personal use is not profitable on most farms.

Live stock is not essential in maintaining fertility.

Distance to the railroad station has an important bearing upon the profits derived from these potato farms.

Farm acre values decrease as distance from the railroad increases, but crop acre values decrease less rapidly.

The proportion of crop acres in potatoes decreases with distance from the railroad.

After a distance from the railroad of 4 or more miles has been reached, potatoes show a low return.

The efficiency in the operation of the farm varies widely and affects the profits greatly.

Coöperative buying and selling has proved very successful in this region.

Farm values are based on farm acres rather than on crop acres.

Diversification lowers profits on these farms.

The following are the four major measures of a successful farm in this area:

1. Crop acres.
2. Yield.
3. Proportion of area in potatoes.
4. Work units per man, or amount of work accomplished per man.

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